

***United States Court of Appeals
for the
District of Columbia Circuit***



**TRANSCRIPT OF
RECORD**

BRIEF FOR APPELLANT AND JOINT APPENDIX

United States Court of Appeals

FOR THE DISTRICT OF COLUMBIA CIRCUIT

No. 16,047

CHARLES F. GROSS,

Appellant,

v.

ROBERT C. WATSON,
COMMISSIONER OF PATENTS,

Appellee

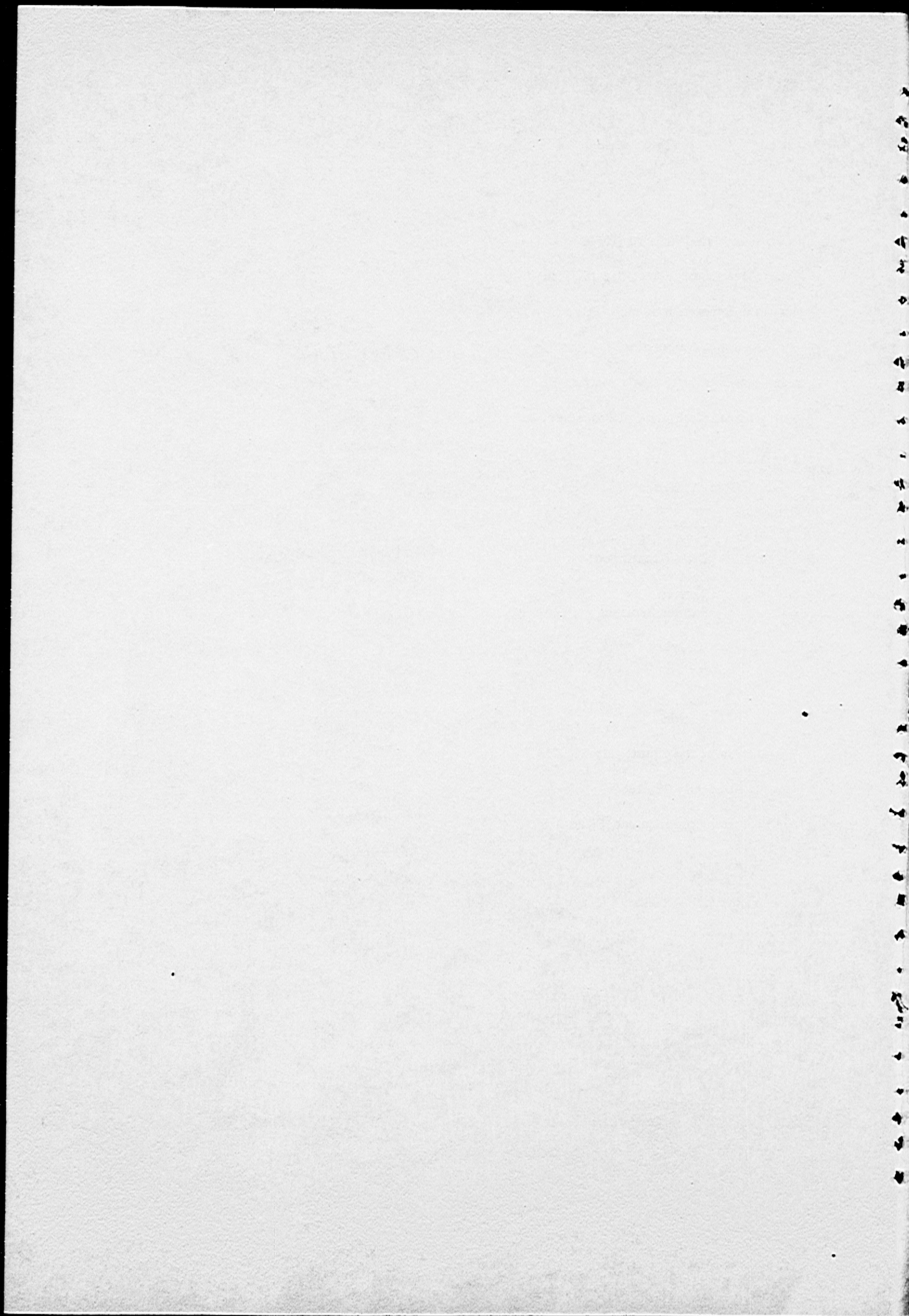
APPEAL FROM THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

A. YATES DOWELL

A. YATES DOWELL, JR.

1345 Pennsylvania Ave., N.W.
Washington, D. C.

Attorneys for Appellant

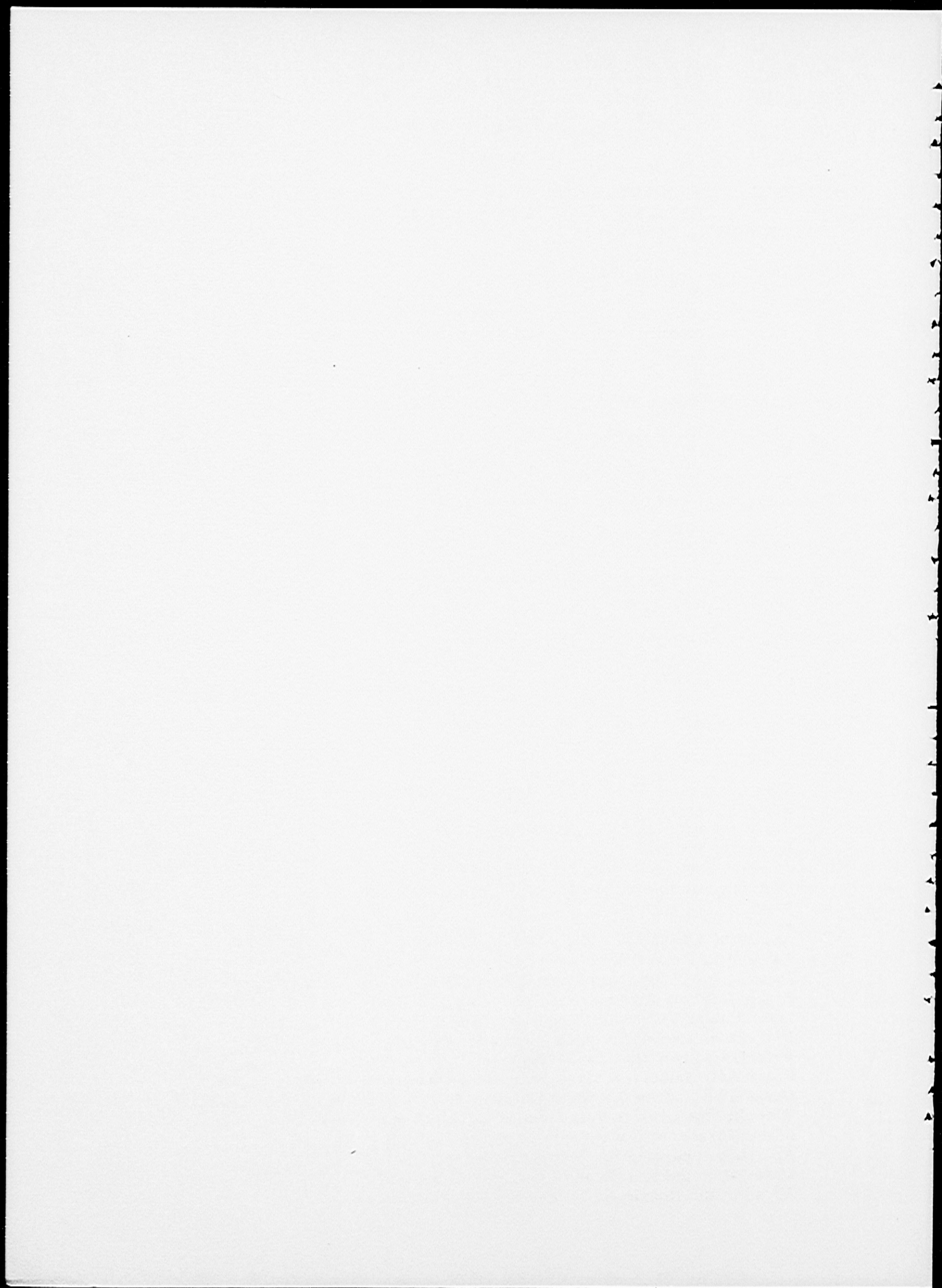


(i)

STATEMENT OF QUESTION PRESENTED

The question presented is:

Whether there was error in the District Court's sustaining of the Patent Office Board of Appeals, the latter having recognized invention in applicant's nozzle for directing ordinarily non-flowable material into irregular concrete expansion joints and cracks, such nozzle including a flattened, downwardly directed open end portion with a rearwardly located discharge opening and with a leveling plate and depressing rib, but having refused other claims merely because they do not include such leveling plate and depressing rib in the combination.



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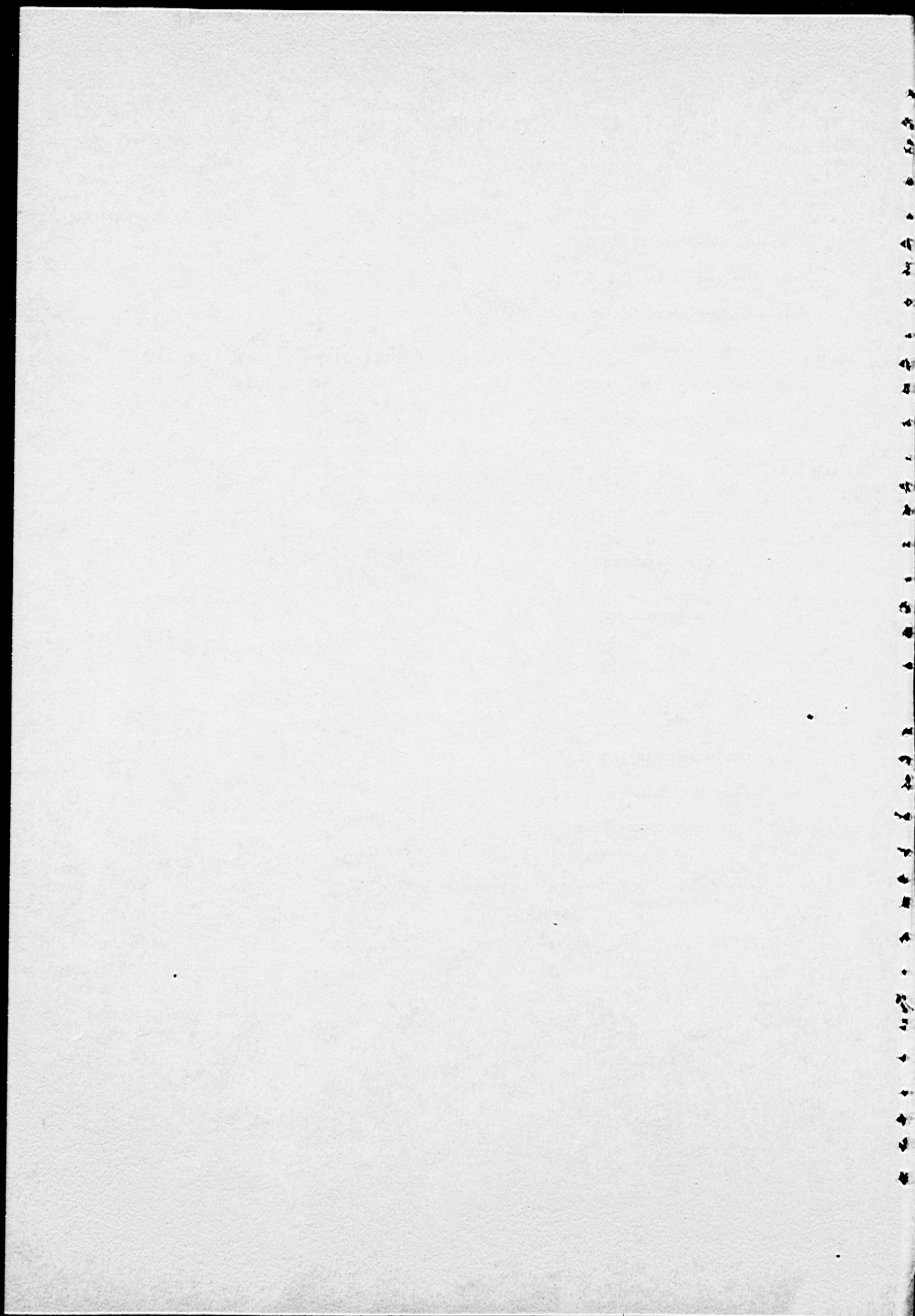
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*UNITED STATES COURT OF APPEALS
For the District Of Columbia Circuit*

No. 16,047

CHARLES P. GROSS,

Appellant,

v.

ROBERT C. WATSON,
COMMISSIONER OF PATENTS,

Appellee.

APPEAL FROM THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

BRIEF FOR APPELLANT

JURISDICTIONAL STATEMENT

This is an appeal from the judgment (JA 94-97, McGuire, J.) of the District Court for the District of Columbia in which the plaintiff's (appellant's) complaint for issuance of letters patent directed to "Joint Filling Machine" was dismissed.

The action was initiated by a complaint (JA 2) filed by appellant in the District Court pursuant to Title 35 of the United States Code, Section 145. The complaint alleges the filing of an application for patent by plaintiff on December 17, 1952, the final rejection by the

Examiner of claims 1, 4, 5, 10, 14, 15, 16 and 18 (reproduced at JA 48-50), the reversal of the Examiner as to claims 1, 4, 5 and 10 and affirmance as to claims 14, 15, 16 and 18. The complaint asserts that the affirmance and hence the refusal of such claims was erroneous and contrary to law and prays for judgment that defendant be authorized to issue plaintiff letters patent including the rejected claims 14, 15, 16 and 18.

In its final judgment the District Court dismissed the complaint. The jurisdiction of the appeal arises from Title 28, United States Code, Section 1291.

STATEMENT OF THE CASE

The subject matter of the application for patent is an apparatus for forcibly filling joints in pavement with a highly viscous filler (claims 14, 15, 16). Claim 18, additionally, is directed to a vehicle for carrying such apparatus, and to joint cleaning means. The joint filling apparatus consists essentially of a nozzle of unique design, of the type indicated in Figs. 1, 2 and 3 (Plaintiff's Exhibit No. 2, JA 52), sheet 2 of the application drawing, JA 34, and in drawings reproduced in the addendum to this brief. Physical examples of such nozzles were introduced into evidence as Plaintiff's Exhibits 4 and 5.

During the trial before Judge McGuire the plaintiff-patent applicant, Charles P. Gross, testified to the problem involved and the success of his invention. Witness Stanley W. Crosthwait, a consulting engineer, testified regarding the prior art patents. Witness Walter I. Newton, Superintendent of the New Castle Airport, Delaware, testified to the problem involved, its solution by the Gross invention, and regarding the prior art patents.

**Conventional Materials and Procedures for Filling
Expansion Joints and Cracks in Concrete Roadways
and Airport Runways**

The Court is familiar with the fact that concrete roadways and runways are provided with joints or spaces between slabs in which a thick, black filling material of asphalt or other substance is applied. This permits the slabs of concrete to expand and contract due to temperature variations, the filling material adhering thereto in order to keep out water and moisture which would have a deleterious effect. Such filling material flows rather easily when heated and is applied when in such condition. Such material has also been used for filling cracks in concrete pavement, both in roadways and airport runways (JA 37, 24, 9).

**The Jet Age Requirements for a New Material and
Apparatus for Filling Expansion Joints and Cracks**

Beginning in about 1947 or 1948, the jet age began to produce a runway problem. The discharge from jet aircraft impinging upon the pavement at high temperature and with great force blasts filling material of the type heretofore used out of the joints (JA 23, 24, 26, Newton; 13, Gross; Plaintiffs Exhibits 7a, 7b, 8a, 8b). As Witness Newton said at JA 24, any material which has to be melted to fill the joint would be melted and blown out by the blast from jet aircraft. This presented, in the first instance, a requirement for a filling material which could withstand the temperature and force of the jet aircraft blast and to apparatus for applying such filling material.

**The Inability of Prior Art Apparatus to Apply the New
Material**

Newton Adverted to the need for material which would stay in a joint and, after having such material, the problem of equipment for its application (JA 24, 25). The witness stated that such material

(exemplified by physical exhibit, Plaintiff's Exhibit 3) does not flow of itself, regardless of whether the temperature is Zero or 150⁰F (JA 28). Gross testified that the thick material can not be applied by apparatus ordinarily used to apply flowable material (JA 15).

The references cited by the Patent Office are the Heltzel patents 1,946,972 (JA 54-72) and 2,636,425 (JA 73-82). Each of these is directed to apparatus for applying flowable material horizontally into a soft concrete joint. In 1,946,972 the Patent Office relies on the apparatus illustrated in Fig. 24 at JA 61. The strip, unnumbered, discharges from the rear of the nozzle 36t which is fed from the tube 65t. The member 56t precedes the nozzle 36t in the unset concrete in order to open a joint therefor. The patent describes the laying of solid joint strips such as illustrated in Figs. 8-17 (JA 55,56) or of laying a plastic or semi-liquid material in the joint (JA 65, column 1, lines 65-67; column 2, lines 99, 100; JA 68, column 1, lines 12, 33, 34). Although such material is described as "plastic or semi-liquid", the only examples given are those as at JA 65, lines 99-100, as follows:

"Tar, asphalt, heavy oil, and other similar plastic or semi-liquid materials may be used."

In the same column, at lines 121-125, appears the following:

"The material may be such as to become hard or semi-hard, or may be such as to remain semi-plastic to serve as a seal for the crack or break between the opposite sections or slabs of concrete."

The other Heltzel patent, 2,636,425, applies material along a horizontal strip as indicated by the numerals 33a, 33b and 37 in Fig. 2, at JA 75 and by numeral 98 in Fig. 4 at JA 77. Such material is described in the patent as plastic or semi-plastic (JA 81, column 5, lines 39-41, 65-71), but no examples are given.

The Board of Appeals did not describe the filler material of the two patents, although it did recognize that it was used in forming a

joint in plastic concrete (JA 90). Gross testified that the Heltzel patent 1,946,972 was solely for use during the laying of concrete and not applicable on a dry joint or dry concrete slab (JA 11, 17, 18). Crosthwait testified that the apparatus of the two Heltzel patents was for use on concrete that had not become set, and that it would be difficult to use it in hard concrete (JA 20, 21). Newton testified similarly (JA 29-31).

Gross explained why the prior art devices could not function in a "dry" or hard concrete joint. He said that because the nozzles in such prior art are closed at their bottom that they can only lay a ribbon of material the width of the nozzle and that such ribbon will not fill the bottom (JA 18, 19). Newton testified that it would not be "obvious" to open the bottom of the Heltzel nozzles (JA 29).

**The Gross Invention — Practical and Successful
Apparatus for Applying the New Material**

The Gross invention is described in the specifications of the patent application appearing at JA 37-47. Reproductions of the pencil drawings filed with the application appear at JA 33-36. To facilitate consideration, reproductions of ink drawings appear in the addendum to this brief. Fig. 1 of the drawings discloses a complete power operated machine with instrumentalities such as the rotary cutter 43 for gouging material out of joints, brushes 56, 57 for removing loose material therefrom, and a downwardly directed nozzle 63 with apparatus for supplying it with material. For the purposes of this proceeding, it is not necessary to consider the details of the over-all machine: certain claims have been allowed covering the machine, including the nozzle and appurtenant structure (claims 1, 4, 5 and 10, JA 48-49). The refused claims, 14, 15 and 16, are directed to the nozzle and appurtenant structure for applying material into the joint. Claim 18 is similar, except that the nozzle is claimed in combination with the vehicle and cleaning means carried by the vehicle.

Although Fig. 1 of the drawings discloses the nozzle 63 as mounted on the vehicle, the application states that the nozzle may be used manually as indicated in Fig. 2 (JA 43), and illustrated in Plaintiff's Exhibit 6 (JA 53).

As is particularly indicated in Figs. 2 and 3 (JA 34, 52, and see addendum to this brief for clearer drawing), the apparatus has a nozzle which is used in the manner illustrated in Plaintiff's Exhibit No. 6 (JA 53) in applying the material. Refused claim 14 (JA 49, 50) describes such apparatus as follows:

"14. Apparatus for forcibly filling joints in pavement with a highly viscous filler, said apparatus comprising a tube having one end terminating in spaced side walls with exterior side surfaces spaced apart less than the spacing of the walls of the joint between which the device is to be inserted for filling, and with the internal surfaces of such walls providing at the end of the tube an elongated depending discharge passage opening downwardly and rearwardly and closed at the front and sides thereof, whereby the highly viscous filler can be forcibly discharged from said passage downwardly into the joint to be filled and upon the filling of the joint at the point of such downward discharge, force exerted upon the filler will be transmitted to the closed front portion of the discharge end of the tube and facilitate forward motion of the apparatus during the filling of a joint."

In simpler terms, the apparatus defined includes a tube end or nozzle which is elongated and which opens downwardly and rearwardly in order that the highly viscous material can be forcibly discharged downwardly into the joint and fill the same from the bottom up, the material from the open rear or back of the nozzle causing a reaction against the opposite portion at the front of the nozzle and thereby indicating that the immediate portion of the joint is filled and that the tube may be moved forwardly.

The importance of having the nozzle discharge downwardly and of the opening at the rear was made plain. Gross said the reason was that

"* * * the joint has got to be filled from the bottom up. If the joint is half full, you are going to get seepage through the material somewhere up and down the line. * * *" (JA 11)

He further testified:

"* * * Before we cut this back out, or the bottom, the back end out of the shoe, we held that on the joint and we got a messy job, we got more material over the joint than we got inside and we never filled the bottom." (JA 9)

He continued:

"We had to make two different size shoes, so it will go in so far and the material will extrude to the bottom of the joint and build itself up and after building itself up, it comes out through the back and by having a filled joint in the back, then we could move the shoe, it would move the shoe ahead a little bit." (JA 9)

The apparatus of the application is for the purpose of applying the material to a new joint or for filling old joints and cracks in concrete (JA 8). The depth of such joints or cracks varies (JA 10). Unless the joint is filled from the bottom up, moisture or water may get down into the space and cause further damage (JA 11).

The Board recognized, as did the examiner, that neither Heltzel patent discloses a nozzle having an opening at its bottom (JA 87).

In referring to the Heltzel patent 1,946,972 (JA 55-72), with particular reference to Fig. 24 (JA 61), the Board of Appeals stated (JA 87, 88):

"We agree with the Examiner that claims 14, 15 and 16 do not distinguish patentably over Fig. 24 of Heltzel (1,946,972). Nozzle 36t, which extends downwardly from flanges 37t, is open rearwardly and closed at the front

and sides and will inherently function, when filler under pressure is discharged therefrom, to facilitate forward motion of the apparatus as called for in these claims. We see nothing unobvious resulting from making the bottom of the nozzle open." (Emphasis supplied)

The final rejection by the Examiner (JA 93) and the refusal of the Board of Appeals were based primarily on the notion that the only difference between the Heltzel nozzle of Fig. 24 and applicant's nozzle was the lack of an opening in the bottom of Heltzel's nozzle. The Patent Office Solicitor, who prepared the findings of fact (JA 94-97), inserted an additional ground, inconsistent with the Board's finding, namely, that the nozzle shown in Fig. 4 of Heltzel patent 2,636,425 (JA 77) is open at the bottom as well as the rear (Finding of Fact No. 8).

With reference to the Heltzel patent 1,946,972, Fig. 24, Gross testified that it would not be useable with the material used

"Because it is sealed on the bottom and the best you are going to get here is just a ribbon the width of your opening" (JA 17).

At JA 18 he explained, saying that, in the Heltzel patent:

"* * * you are going to get your pressure on the side, you are not going to get any pressure to lay in the bottom * * *."

Witness Newton, Superintendent of the New Castle Airport, testified that on the New Castle job of 1954 his specification called for the joints to be filled completely from the bottom up (JA 28). However, the joints were so variable in width and depth that it required 4,443 gallons of material instead of 2,600 as calculated (JA 28).

He said that the heavy material that was used to fill the joints, in his opinion, could not be applied with the devices of the two Heltzel patents (JA 29).

**The Recognition of Invention by the
Patent Office Board of Appeals**

Claims 1, 4, 5 and 10 (JA 48, 49) were refused by the Examiner but allowed by the Board of Appeals. Of these, claims 1, 4 and 5 are directed to a wheeled vehicle with various instrumentalities. Claim 10 is directed merely to apparatus, including a nozzle and appurtenances. With reference to claim 10, the Board said (JA 88):

"We can not agree with the Examiner, however, with respect to claim 10 which defined the rib and the nozzle as projecting from one side of the plate and positions the rib rearwardly in alignment with the rear opening of the nozzle, thereby serving to limit the height of the filling material in the joint groove. Neither patent to Heltzel discloses a rib, much less the claimed relation thereof with the nozzle. On the basis of the Heltzel patents, the rejection of claim 10 will not be sustained."

Claim 10 (JA 49) accordingly was allowed because of the relation of the nozzle (opening downwardly and rearwardly) with the rib mounted on a plate at the rear of the nozzle. The plate and rib serve the purpose of leveling the material which has been applied by downwardly directed pressure and limiting its height in the joint groove. Thus, invention has been recognized in such nozzle with the described appurtenances.

**The Refusal to Allow Claims Covering
the Heart of the Invention**

As previously stated, the Board of Appeals allowed claim 10 (JA 49) which defines the nozzle of claim 14 and, in addition, the appurtenant plate and the rib projecting therefrom for leveling purposes. Thus, the Board has allowed a claim (No. 10) because of the inclusion of features such as the leveling plate and attached rib (Fig. 3 of application drawings, indicated by the numerals 66 and 79) but has denied in claim 14 the same apparatus in the absence of such leveling plate and rib, although recognizing that the nozzle, without these features, is not disclosed in the prior art (JA 87).

STATUTES INVOLVED

35 U.S.C. 103 (Sect. 1 of the Patent Act of July 19, 1952, 66 Stat. 792):

"A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made."

STATEMENT OF POINTS

The points upon which Appellant relies in this appeal are:

1. The invention is directed to apparatus which has solved a jet age airport problem, namely, the complete filling of cracks and expansion joints of irregular height and depth between concrete runway slabs with material which can not be blasted out or dislodged by the intense heat and force of the jet aircraft discharge.

2. Applicant's nozzle, having a flattened tube and with a downwardly and rearwardly directed discharge opening for filling irregular runway cracks with highly viscous material and providing a visible indication of complete filling in addition to self-propulsion movement when filling is complete, is patentable over the closest apparatus known to the prior art, namely, a mere backwardly directed open tube end for laying a uniform ribbon of flowable material in soft concrete. The combination of the nozzle, with a vehicle carrying pressure applying apparatus for supplying the viscous material to the nozzle and for cleaning the joint ahead of the nozzle, is patentable a fortiori.

SUMMARY OF ARGUMENT

Applicant found a solution to a problem called to his attention and which solution is not present in the prior art including the two Heltzel patents 1,946,972 and 2,636,425. Prior art apparatus and flowable materials used with such apparatus were not suitable for applying a stable filler in the joints and cracks of roadways and runways subjected to great heat and pressure such as the discharge from jet aircraft, the prior materials being dislodged by the hot blast therefrom. In order to satisfactorily fill the joints, it was necessary to have a material which was non-flowable even at elevated temperatures unless subjected to heavy pressure and to apply the same downwardly into the joint to fill the joint or crack from the bottom up.

Applicant's applicator nozzle when in use extends vertically downwardly so that the principal force is downward insuring that filling will be from the bottom up while in the Heltzel patents the bottom of the applicator is closed and the discharge from the nozzle is in a generally horizontal direction and not in a vertical direction. Additionally, applicant's nozzle has a rearwardly directed opening to tend to move the nozzle forward as the joint is filled, thereby assuring complete and accurate filling from the bottom up with decreased likelihood of overfilling.

It would not have been obvious to one having ordinary skill in the art to modify previously known apparatus to produce that of the refused claims. The refusal by the Board of Appeals of the claims to a novel nozzle is inconsistent with its allowance of claims to such nozzle with a leveling plate and rib — the nozzle, itself, is the heart of the invention. L-O-F Glass Fibers Co. v. Watson, Comm'r. of Patents, 97 U.S. App. D.C. 69, 228 F.2d 40 (1955).

ARGUMENT

The Invention is Directed to Apparatus Which Has Solved a Jet Age Airport Problem, namely, The Complete Filling of Cracks and Expansion Joints of Irregular Height and Depth Between Concrete Runway Slabs With Material Which Can Not be Blasted Out or Dislodged by the Intense Heat and Force of the Jet Aircraft Discharge.

Expansion joints in concrete runways are a familiar sight and sensation to every user of our highways. These joints often project above the surface and cause bumping of cars passing over them. In addition, cracks occur in concrete roadways and are filled with the same substance. Examination of the substance reveals that it is an asphalt base material which, when heated, will readily flow.

The runways of airports are constructed of concrete and have joints as do automobile roadways. These joints served adequately until the advent of jet aircraft and it was found that the hot blast melted and dislodged the material (JA 23, 24). Graphic evidence is indicated in photographs 7a and 7b, to which reference is made at JA 24, 26 illustrating the appearance of a portion of a runway after jet aircraft had blasted ordinary filler material out of its joints and caused it to spread over the upper surface of the concrete.

In order to meet the problem, it was necessary to first provide a material which could not be dislodged by the heat and force of the jet. A sample of such material is Plaintiff's physical exhibit, Exhibit 3, such material being within the container. The material is highly viscous and will not flow, whatsoever, unless great force is applied. For example, if the container is inverted there is no tendency of the material to flow out. However, it was necessary to provide apparatus by means of which such material could be adequately and economically applied to runways (JA 7, 24). Previously known apparatus for extruding a ribbon of relatively flowable material into unset concrete by having a backwardly directed nozzle offered no solution (JA 29).

Applicant's apparatus has provided a solution to the problem (JA 24, 25, 28, 12-14). It has been used successfully at many airports, including that at New Castle, New Jersey, in 1954, at the Pomona Naval Air Base in Atlantic City and the Glenn Martin Company.

Applicant's Nozzle, Having a Flattened Tube and With a Downwardly and Rearwardly Directed Discharge Opening for Filling Irregular Runway Cracks With Highly Viscous Material and Providing a Visible Indication of Complete Filling In Addition to Self-propulsion Movement When Filling is Complete, Is Patentable Over the Closest Apparatus Known to the Prior Art, Namely, a Mere Backwardly Directed Open Tube End for Laying a Uniform Ribbon of Flowable Material in Soft Concrete. The Combination of the Nozzle, With a Vehicle Carrying Pressure Applying Apparatus for Supplying the Viscous Material to the Nozzle and for Cleaning the Joint Ahead of the Nozzle, is Patentable A Fortiori.

The testimony is that the problem involved was the application of highly viscous or unflowable material to completely fill expansion joints and cracks of irregular size. Unless the cracks are completely filled, damage may result. Ordinary backwardly directed nozzles simply provide a ribbon at the top of the joint but do not fill from the bottom up.

The Board of Appeals stated that merely opening the bottom of one of the backwardly directed nozzles would not require invention (JA 87, 88). However, even if the modification were made, this would not produce the structure defined in the refused claims. Applicant's nozzle is a tube end essentially directed vertically downwardly rather than directed horizontally as in the prior art. Thus, the principal force in applicant's nozzle is directed downwardly to fill the bottom-most portion of the joint or crack. This may have a depth of only an inch or two or several inches and be of variable width. Hence, the quantity of material required to fill a portion of a joint or crack varies

widely. If an operator moves the tool ahead too rapidly at any given instant, the joint may not be completely filled. Since the material is not a liquid, the operator can not by visual observation determine when the portion of the joint is filled. The nozzle must have a downward discharge and the material coming from the nozzle must push down into the joint until it completely fills the same from the bottom up before the job is done. Without having an indication of complete filling, e.g. the tendency of the nozzle to move forwardly, the operator must guess as best he can, and this results in having "a smeared job" and not actually getting to the bottom of the joint (JA 7).

By providing an opening at the rear of the nozzle, material discharging therefrom first fills the joint from the bottom up and builds up a lateral pressure which tends to push the nozzle forwardly. So long as the nozzle is discharging downwardly to fill the joint, the tendency to force the nozzle ahead is not great. However, when the portion of the joint is filled from the bottom up, then the discharge out the back reacts against the material already laid and this inherently tends to move the nozzle forwardly. Thus, the operator's feel of the device and its tendency to move ahead accurately indicates the rate at which it should be advanced at any instant of time (JA 9, 16, 25). There is nothing in the prior art which remotely suggests an indication of this character.

In the Heltzel patents the nozzles are closed at the bottom and open at the rear for the purpose of laying horizontal ribbons of material. The fact that the Heltzel patent 2,636,425, Fig. 4 (JA 77), discloses a nozzle 92 which is angularly inclined does not suggest the structure defined in the refused claims and in order to reject the claims the Patent Office and the lower court have had to reconstruct the structures of the prior art.

In addition to the features to which attention has been directed, claim 15 (JA 50) adds the limitation of a lateral flange for engaging the

upper surface of the pavement at the sides of the joint. This should be patentable in the combination as it assists in the leveling of the material. Claim 16 (JA 50) adds the limitation of a surface extending from the tube at the discharge passage with a downwardly projecting surface portion. In the combination the additional structure serves to groove the material being laid. Claim 18 (JA 50) defines the novel nozzle in combination with a vehicle and joint cleaning means carried thereby. Such combination is likewise novel and should be patentable.

The Board of Appeals Recognized Invention in Applicant's Nozzle But Erred in Holding the Same Unpatentable in the Absence of Refinements Including a Leveling Plate and Depressing Rib.

The decision of the Board recognizes that invention is involved in the nozzle described, but improperly rejected claims lacking appurtenances, namely, the leveling plate 66 and the downwardly projecting rib 79. We submit that, if the nozzle is patentable with these features, that it should be patentable without them.

Applicant's nozzle differs essentially from those of the prior art. Applicant's nozzle directs material downwardly, whereas previously known nozzles have directed material horizontally. The prior art devices are for laying material of uniform height and width along a horizontal line. Applicant's device is for laying material into a joint or crack of variable height and thickness. The prior art devices are for laying relatively flowable material notwithstanding the statement in patent 2,636,425 that enormous pressure is used to advance the material through a hopper and injecting tube. Applicant's device is for laying material which is non-flowable except under extremely high pressure. In the prior art a uniform strip of material is ejected in a horizontal ribbon at a uniform rate, and thus the ejecting apparatus is advanced at a uniform rate but the bottom of the joint need not be

filled and this is a fatal defect. In applicant's apparatus the discharge nozzle is downwardly disposed and material is forced downwardly to fill an irregular crack from the bottom up, which may require little or a great deal of material at any instant, and hence the advance is not uniform. In applicant's device forward motion is indicated by the tendency of the apparatus to move forwardly as the section beneath the tool becomes filled.

In view of the above, it is submitted that there is invention in applicant's apparatus as expressed in claims 14, 15, 16 and 18 and the Patent Office and the District Court erred in failing to recognize it and to authorize the issuance of a patent thereon.

CONCLUSION

We respectfully submit that applicant has made a meritorious advance in the art, solving a problem whose solution was not suggested in the prior art, and that the decision of the District Court should be reversed, authorizing the Commissioner of Patents to issue a patent on claims 14, 15, 16 and 18 of the application in suit.

Respectfully submitted,

A. YATES DOWELL

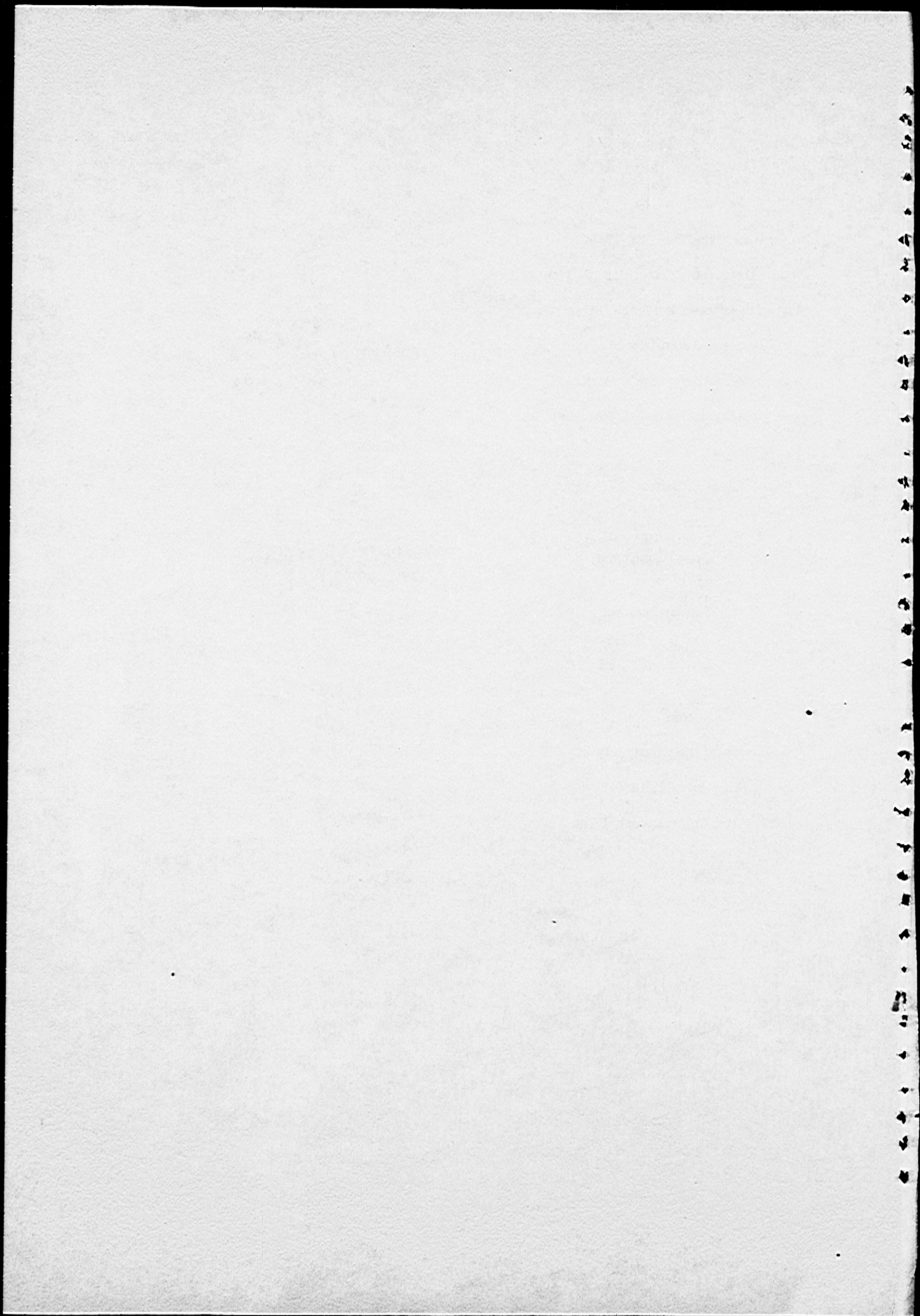
A. YATES DOWELL, JR.

1345 Pennsylvania Avenue, N.W.
Washington, D. C.

Attorneys for Appellant

December 23, 1960





ADDENDUM

[Excerpts from Plaintiff's Exhibit #1,
Sheets, 2, 3 & 4 of Application
drawings in ink]

and

[Plaintiff's Exhibit 2]

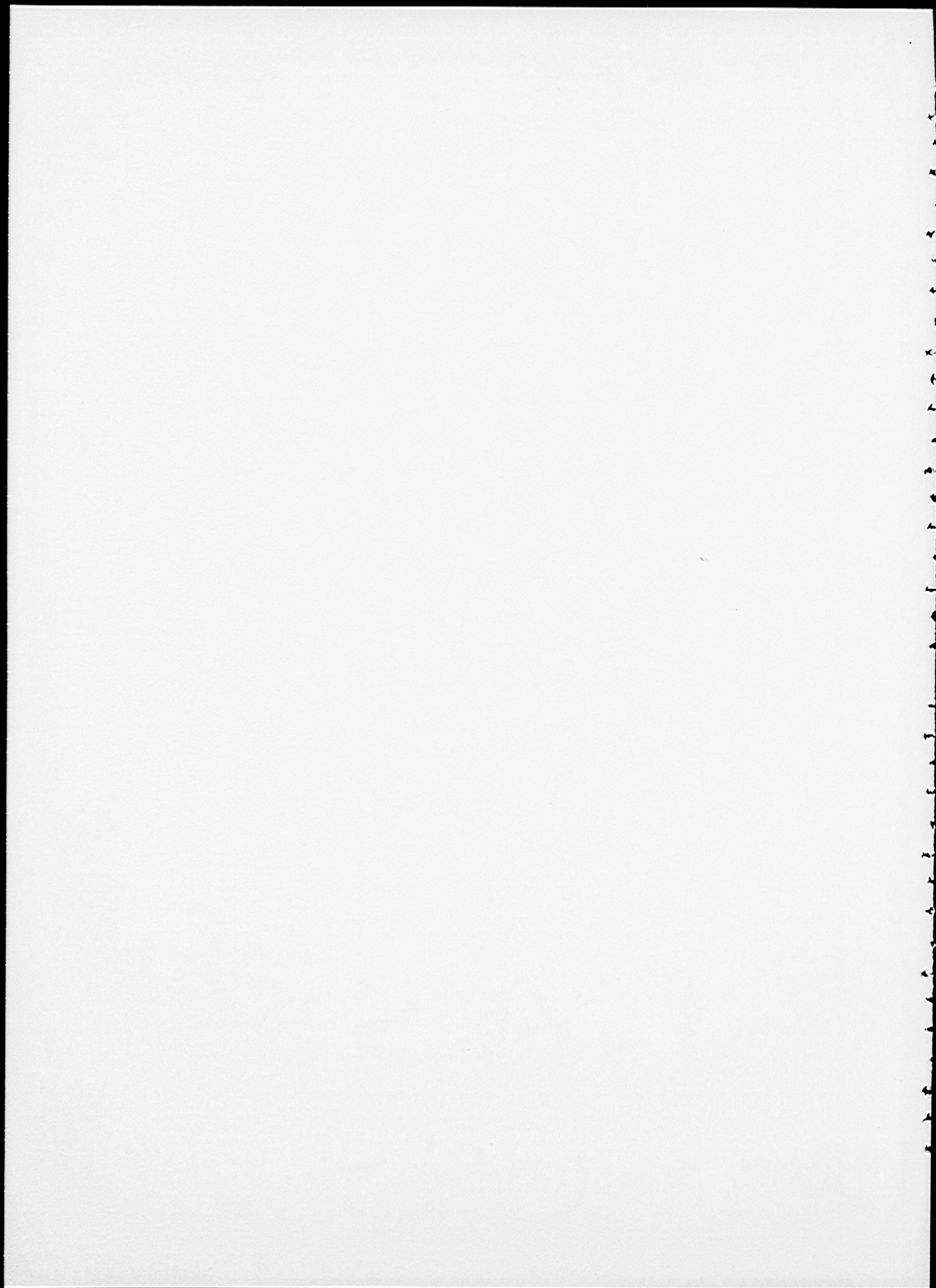




FIG. 4

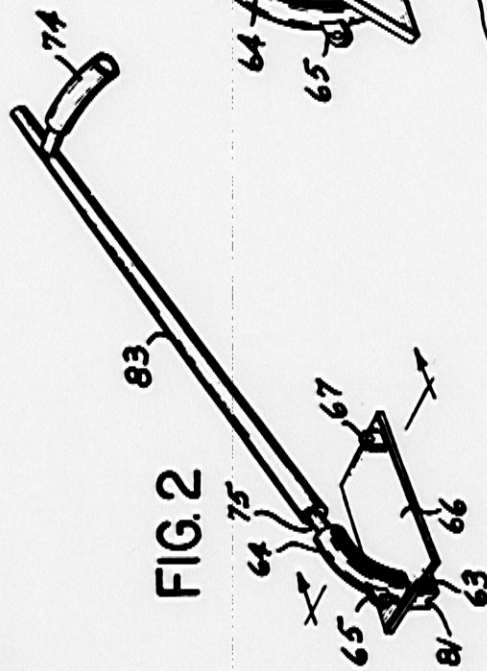


FIG. 2

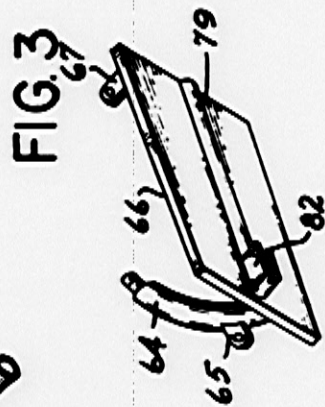


FIG. 3

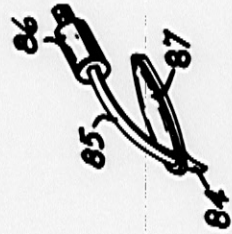


FIG. 6

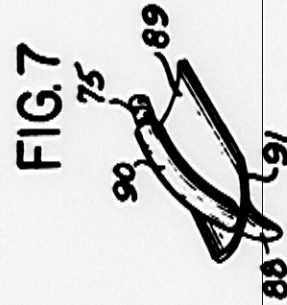


FIG. 7

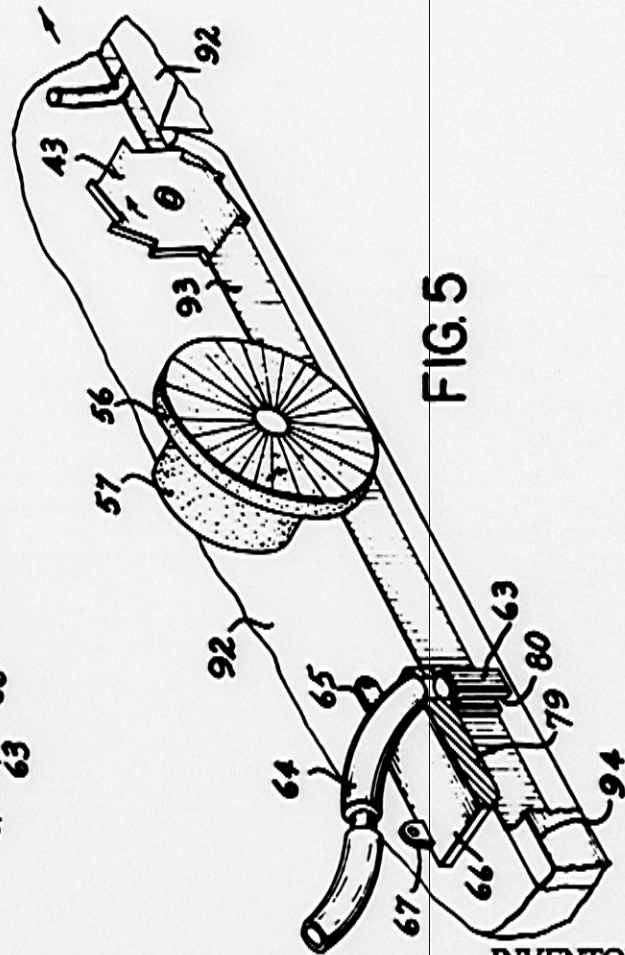


FIG. 5

INVENTOR
CHARLES P GROSS

BY

[Signature]

ATTORNEY

FIG. 8

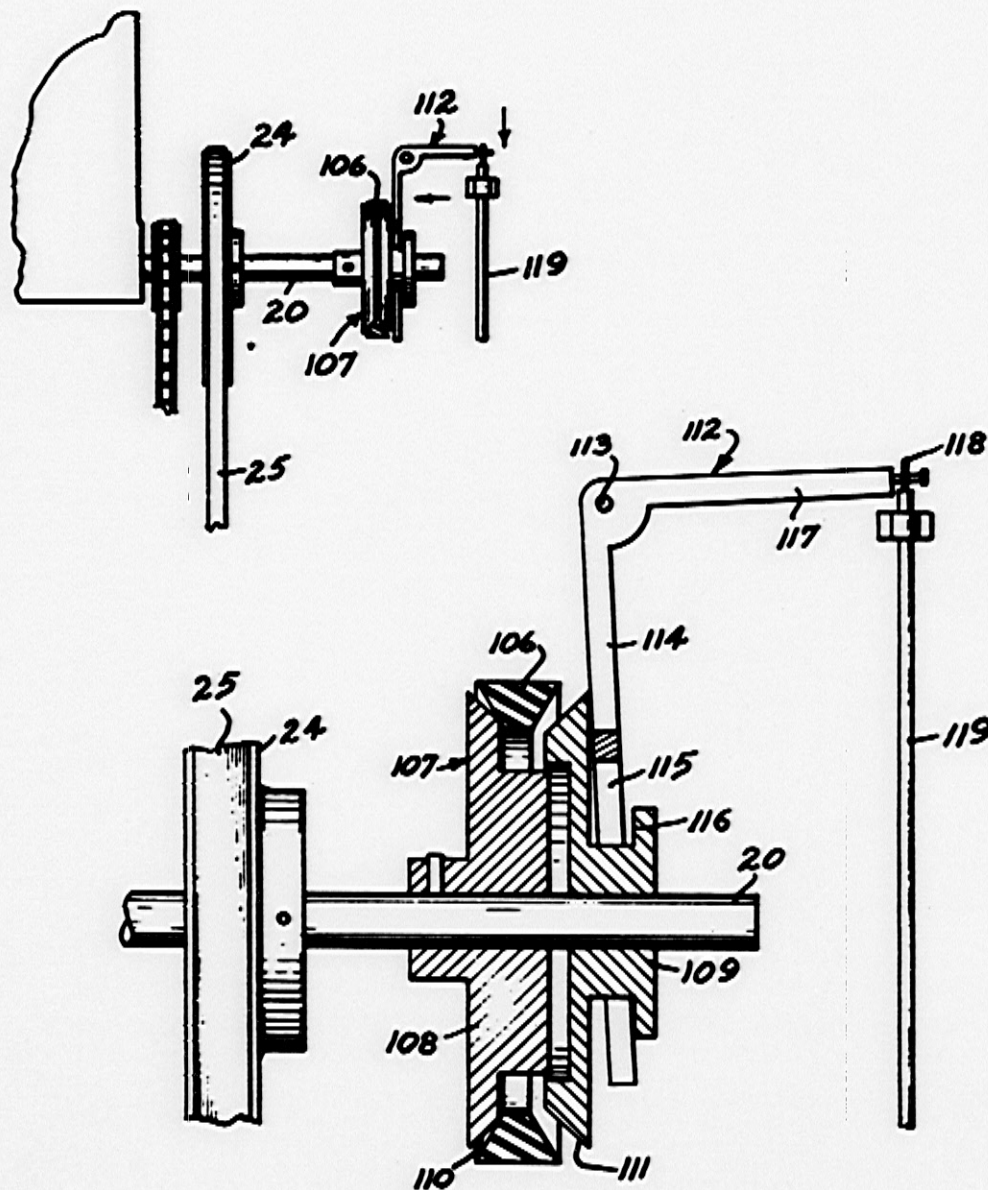


FIG. 9

INVENTOR
CHARLES P. GROSS

BY

Charles P. Gross
ATTORNEY

A-3
PLAINTIFF'S EXHIBIT #1
Sheet 4

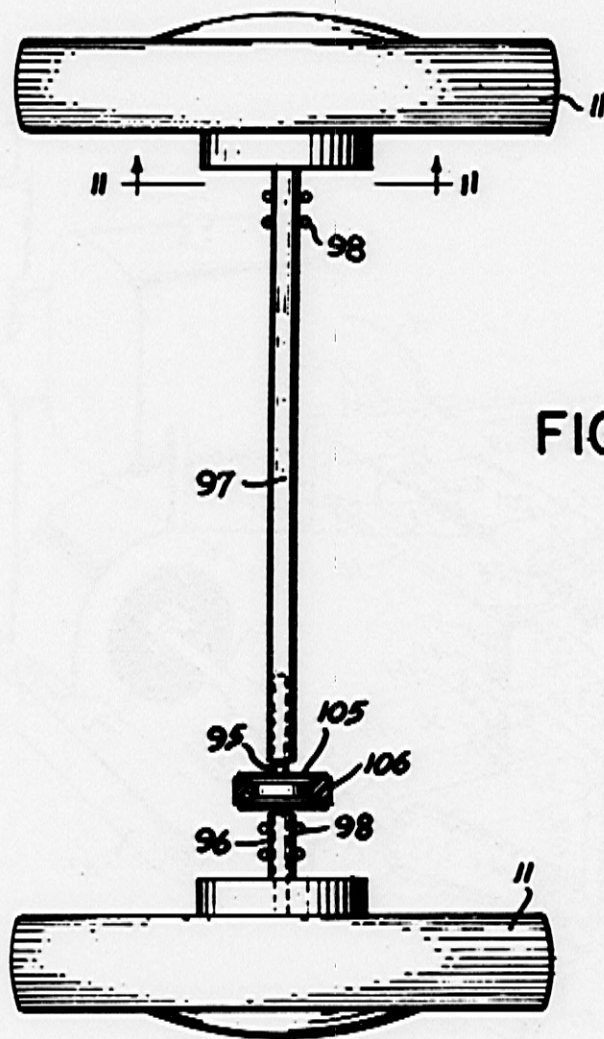


FIG. 10

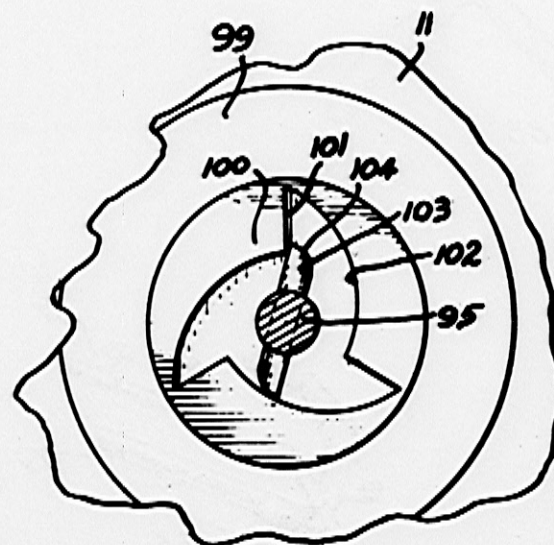


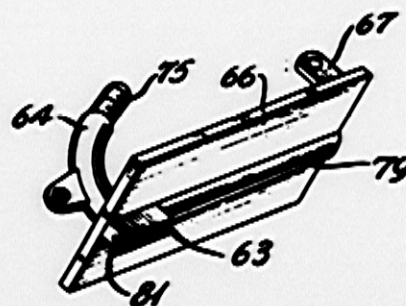
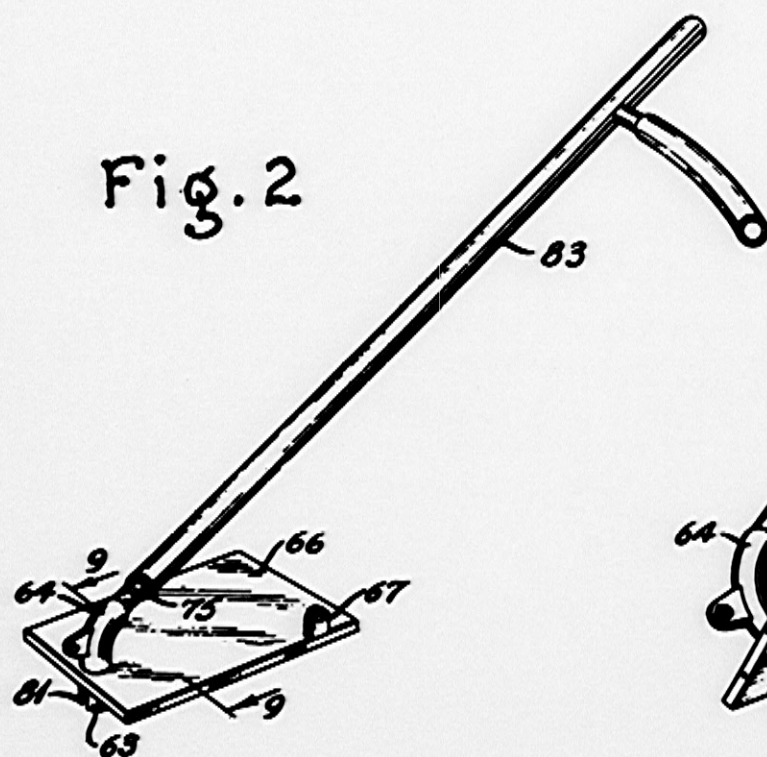
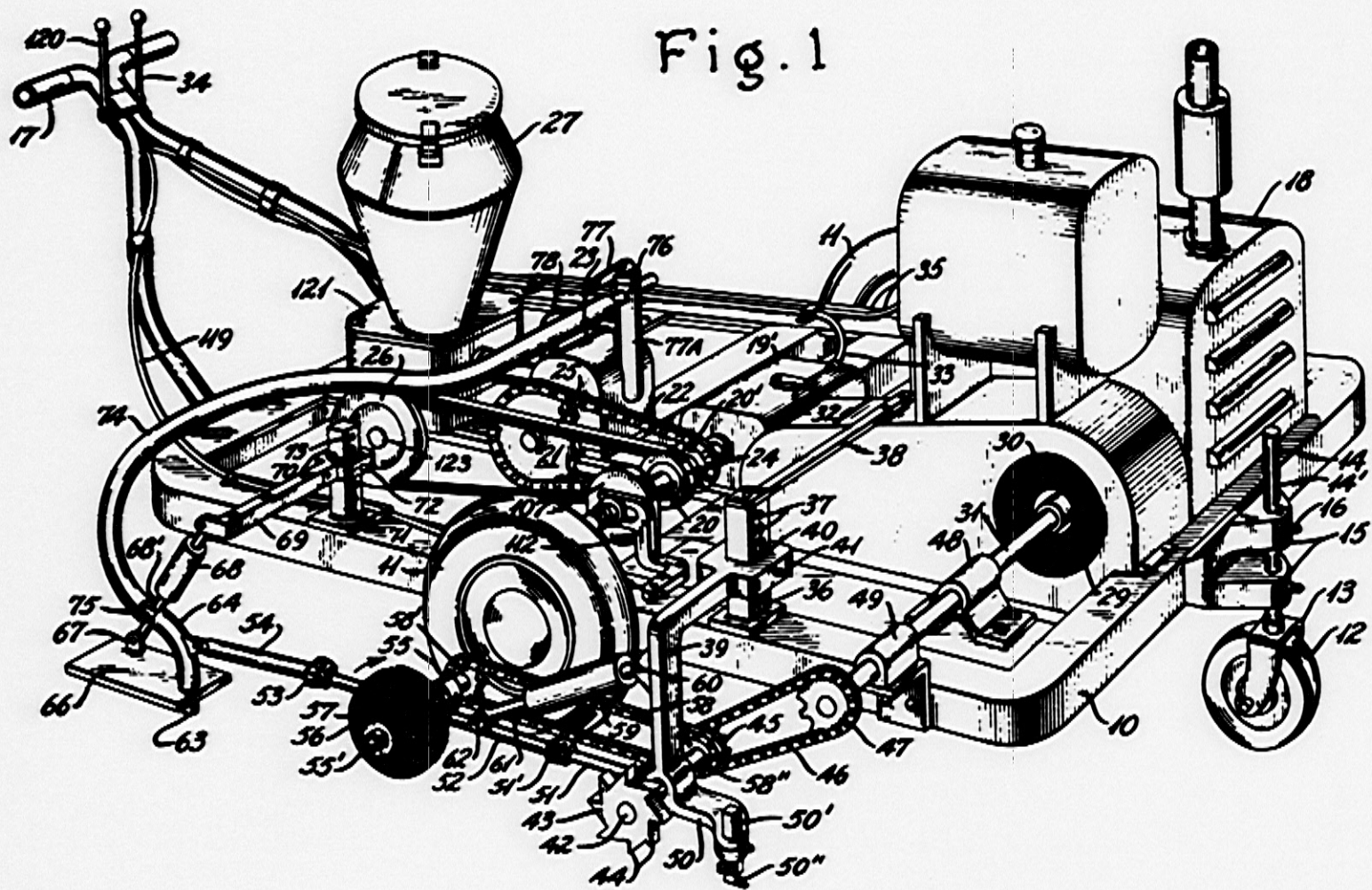
FIG. 11

INVENTOR
CHARLES P. GROSS

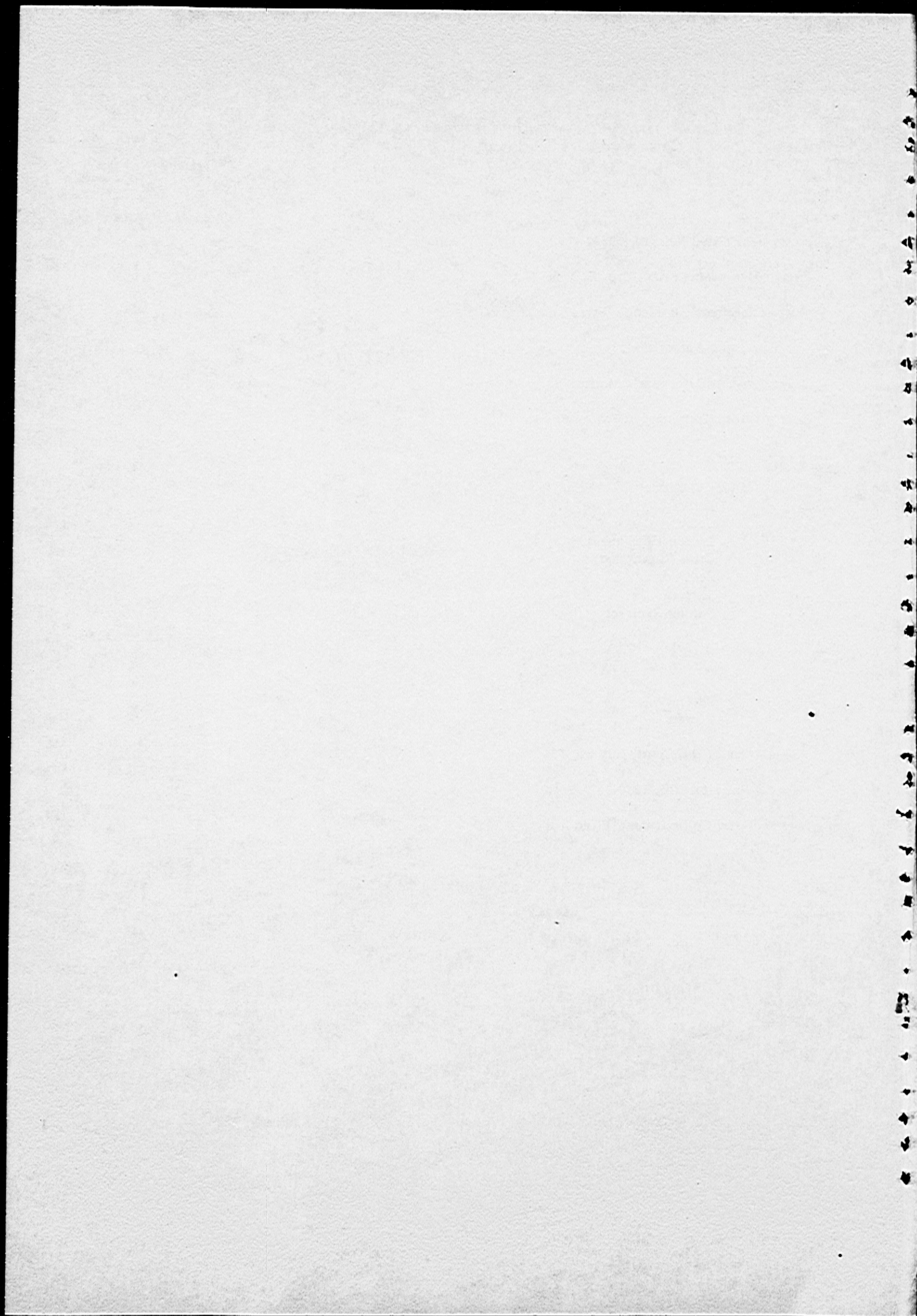
BY

Charles P. Gross
ATTORNEY

A-4
PLAINTIFF'S EXHIBIT # 2

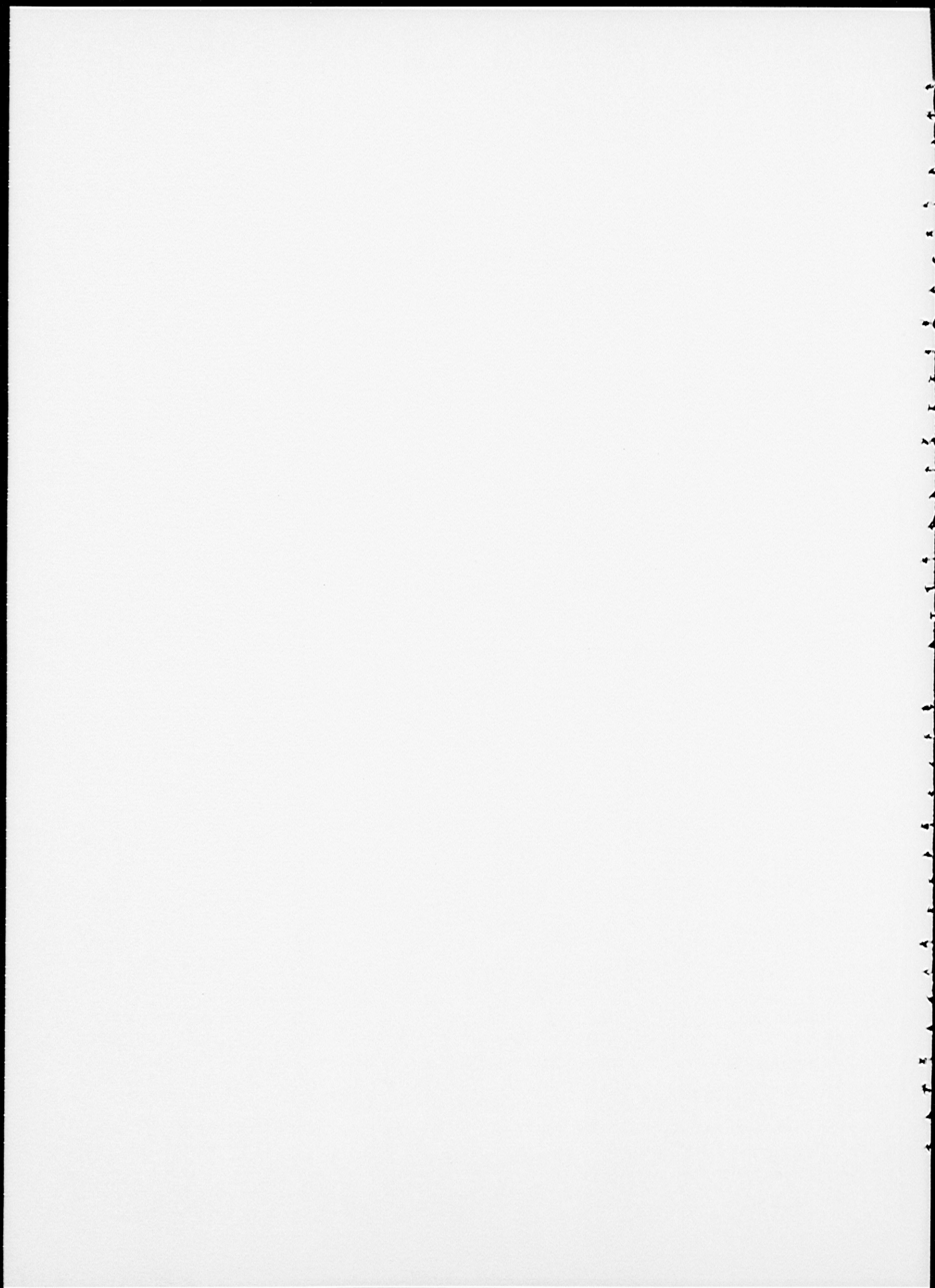


Handwritten musical notation on a single staff, oriented vertically along the left edge of the page. The notation includes a treble clef at the top, followed by a series of notes, rests, and bar lines. The handwriting is in black ink on aged, slightly textured paper.



(i)
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JOINT APPENDIX

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

CHARLES P. GROSS
4205 Brigantine Blvd.,
Brigantine, New Jersey,
Plaintiff

v.

ROBERT C. WATSON
Commissioner of Patents
Washington 25, D. C.,
Defendant.

Civil Action No. 1681-58

RELEVANT DOCKET ENTRIES
IN THE DISTRICT COURT

Complaint	June 26, 1958
Answer	August 12, 1958
Trial	April 12, 1960 (McGuire, J.)
Memorandum of Court	July 12, 1960
Findings of Fact and Conclusions of Law	Filed October 12, 1960
Judgment	July 20, 1960
Notice of Appeal	September 16, 1960

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

[Filed June 26, 1958]

CHARLES P. GROSS
4205 Brigantine Blvd.,
Brigantine, New Jersey,
Plaintiff

v.

ROBERT C. WATSON
Commissioner of Patents
Washington 25, D. C.,
Defendant.

Civil Action No. 1681-58

COMPLAINT
LETTERS PATENT

To the Honorable Judges of the United States
District Court for the District of Columbia

1. Plaintiff, Charles P. Gross, is a citizen of the United States and a resident of Brigantine, New Jersey.

2. Defendant, Robert C. Watson, is the Commissioner of Patents of the United States, a legal resident of the District of Columbia, and is sued in his official capacity.

This complaint is filed in accordance with the patent laws of the United States 35 USC 145. No Appeal has been filed in the United States Court of Customs and Patent Appeals.

4. Plaintiff, Charles P. Gross, filed an application entitled JOINT FILLING MACHINE on December 17, 1952, which was identified by Serial No. 326,471, and said application was filed in accordance with the laws of the United States and the rules of the Patent Office.

5. Thereafter, the application for patent was examined by the Patent Office Examiner in charge thereof, who, on October 31, 1955, finally rejected the claims of this application.

6. Thereafter, on April 30, 1956, an appeal was duly taken to the Board of Appeals of the United States Patent Office, and on April 28, 1958, the Board of Appeals rendered its decision, affirming the Examiner's rejection of claims 14, 15, 16 and 18, and reversing his decision as to claims 1, 4, 5 and 10.

7. The rejected claims are:

14. Apparatus for forcibly filling joints in pavement with a highly viscous filler, said apparatus comprising a tube having one end terminating in spaced side walls with exterior side surfaces spaced apart less than the spacing of the walls of the joint between which the device is to be inserted for filling, and with the internal surfaces of such walls providing at the end of the tube an elongated depending discharge passage opening downwardly and rearwardly and closed at the front and sides thereof, whereby the highly viscous filler can be forcibly discharged through said passage downwardly into the joint to be filled and upon the filling of the joint at the point of such downward discharge, force exerted upon the filler will be transmitted to the closed front portion of the discharge end of the tube and facilitate forward motion of the apparatus during the filling of a joint.

15. The structure of claim 14 in which the apparatus has a lateral flange for engaging the upper surface of the pavement at the sides of the joint.

16. The structure of claim 14 having a surface extending from the tube at the rear of the discharge passage with a downwardly projecting surface portion.

18. Apparatus for cleaning and filling joints comprising a vehicle, joint cleaning means carried by said vehicle, an applicator for supplying highly viscous filler downwardly under high pressure directly into a joint to be filled, and power means for discharging highly viscous filler with great force from said applicator into and along said joint and a depending discharge portion for location in the cleaned joint for filling the same, said depending portion of the applicator having a pair of side walls and a connecting front wall with the rear end of the applicator open and whereby upon extrusion by the application of force the filler will be discharged directly downward into the joint and the exerted force will be transmitted to the front wall of the applicator and facilitate forward motion of the apparatus as the joint is filled.

8. Plaintiff alleges that the decision of the Board of Appeals adjudging that plaintiff is not entitled to a patent including the rejected claims was erroneous and contrary to law.

9. This Complaint is filed within the limitations of time required by law.

10. Plaintiff makes proffert of a copy of the aforesaid application and of the papers in the file thereof.

WHEREFORE, plaintiff respectfully prays as follows:

A. For a decree that plaintiff is entitled to receive Letters Patent for JOINT FILLING MACHINE shown and described in the aforesaid application, Serial No. 326,471, in due form of law as prescribed by the Statutes.

B. For a decree pursuant to Section 145, Revised Statutes, United States Code Title 35, authorizing the Commissioner of Patent to issue Letters Patent on said JOINT FILLING MACHINE including the aforesaid claims 14, 15, 16 and 18, in due form of law as prescribed by the Statutes.

C. That plaintiff have such other and further relief as the nature of the case may admit and as may be just and equitable.

June 26, 1958

/s/ A. Yates Dowell and
A. Yates Dowell, Jr.
1345 Pa. Ave., N.W.
Washington 4, D. C.
Attorneys for Plaintiff

[Filed August 12, 1958]

Clarence W. Moore, Solicitor,
United States Patent Office,
Washington, D. C.
Attorney for Defendant

ANSWER TO THE COMPLAINT

To the Honorable the Judges of the United States District Court for the
District of Columbia.

1. The defendant admits the allegations of paragraph 1 of the complaint.

2. The defendant admits that he is the Commissioner of Patents of the United States and is sued in his official capacity. The defendant denies that he is a legal resident of the District of Columbia. The defendant states that he is an official resident of the District of Columbia.

3, 4, 5, 6, 7. The defendant admits the allegations of paragraphs 3, 4, 5, 6, and 7 of the complaint.

8. The defendant denies the allegations of paragraph 8 of the complaint.

9, 10. The defendant admits the allegations of paragraph 9 and 10 of the complaint.

FURTHER ANSWERING, the defendant asserts that the plaintiff is not entitled to a patent on his application involved in this civil action containing any of claims 14, 15, 16, and 18, thereof, for the reasons given and in view of the references cited in the Examiner's answer and the decision of the Board of Appeals in that application. Profert hereby

is made of copies of said answer, decision and references.

Respectfully submitted,

/s/ C. W. Moore
Solicitor, United States Patent
Office.
Attorney for Defendant

[Certificate of Mailing]

EXCERPTS FROM TRANSCRIPT OF PROCEEDINGS

1

Washington, D. C.
April 12, 1960

The above-entitled action came on for trial on the merits, before the HONORABLE MATTHEW F. McGUIRE, United States District Judge, at 10:15 o'clock a.m.

* * * * *

19

MR. KREIDER: * * *

* * * * *

20

Now, it is interesting to note that claims 1, 4, 5 and 10, the claims which are allowed here, were the only claims which the plaintiff was contending for at the time the Examiner in the Patent Office gave this case a final rejection. If the Examiner had allowed those claims at that time instead of rejecting them, the plaintiff would have had the claims he now has and no opportunity to prosecute others. However, the Office was prevailed upon to permit the plaintiff to add the claims now in issue for purposes of appeal, these claims being broader than the subject matter allowed.

* * * * *

39

MR. DOWELL: * * *

He mentioned there, there were only four claims in the case before the final rejection and it is common practice to try to boil your claims down to as few as possible to get allowance and then to appeal other claims if it seems essential, and I noticed in the file history here, where we said we cut down the claims hoping that they will be allowed, but the

Examiner wouldn't allow them.

* * * * *

40

CHARLES P. GROSS

Plaintiff, called as a witness in his own behalf, being first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. DOWELL:

Q. You are Mr. Charles P. Gross, the applicant here, are you not?

A. Yes, sir, I am.

Q. State where you live and the type of business in which you are engaged. A. I live at 4205 Brigantine Boulevard, Brigantine, New Jersey, and we are in the waterproofing expansion joint spall repair business at present.

* * * * *

41

Q. Tell us something of your experience and background.

A. Background, we started in 1944 in the waterproofing business, roof coatings and such on a commercial basis and as we went along, why, we were told by different people, superintendents and managers of fields and highways to try to figure out something especially for expansion joints due to the jet age coming along, that there will be a terrific demand and specialty work in the line. They all seemed to know what they were talking about, because that was it.

We first tried to get someone to make material. Well, we had so many people making material that we had to find a place to make tests.

The New Castle County Airport has given us permission, for the last 10 or 12 years, to make tests on one of their platforms and we have been trying everybody's material because we are not interested in the material, we are interested in the best of them. We came along and we started, tried different people's material out. First, we started with just a plain piece of pipe, as was stated here earlier, no notches in the

42

side or back. Well, it did a pretty smeared job and never got to the bottom of the joint.

We flattened the pipe and cut the back end out and the bottom, that way we were able to get the joint filled from the bottom up and as we went along, but it was tedious because you had to keep your pressure down to a point and a lot of times you would have the material coming up above the level, the highway level or the concrete level.

Q. Before we get into too much detail as to the particular type of nozzle that you used, I hand you a leaflet and ask you if that is a leaflet that you have prepared? A. This is our work that we have, we decided to concentrate on that type, this type equipment and everything. It seemed that this type of equipment would cover all phases of the work. If Your Honor would like to see some of these joints --

THE COURT: I have to see them when they come up in the usual course.

MR. DOWELL: We would like to offer that as Plaintiff's Exhibit 6.

* * * * *

43 Q. Refer to this exhibit and tell us, for example, what picture No. 8 represents. A. Eight, that is the center in the bottom row, that is a spalled joint after the application. Well, "spall" means eroded or broken concrete and it usually happens around a joint or also in a concrete slab that has cracks and at the crack, the concrete had loosened around the spall. Now, a lot of times they run maybe four inches wide on each side of a joint. Now, at that time, we had the preparation that would fill and support, build up that joint to a point where you could drive over it.

Q. The other figures have footnotes beneath them describing what they are? A. Yes.

Q. They were put there by you, is that correct? A. Yes.

44 Q. Now, in this work that you were doing, state whether it was in areas where the construction was already there or if it was in the fresh laying of roadways. A. Mostly all old joints and old concrete. We had in there equipment, there were one or two pieces of equipment you could buy that would take the old joint out, but we found in using that equipment, it tore up the side walls and tore a lot of places, created

a lot of the spall work, so we had to figure ways of removing the old material to a point where we turned around and cleaned the joint, because if you didn't remove all the asphalt contents or the rubber base materials, the heat would in the summer time melt that rubber base and it would blend in and you still wouldn't have a sealed joint.

THE COURT: The spall, you mean the cracking of the side wall on either side of the groove?

THE WITNESS: Yes, that is fine. We used this one shoe, like I said, that was made, that is attached to the pipe as you see them on the photographs there, that shoe, that was fine and we applied the material.

BY MR. DOWELL:

Q. I hand you Plaintiff's Exhibit 4 and 5 and ask you to explain.

A. I would like to go back further, before we cut this back end out or the bottom, the back end out of the shoe, we held that on the joint and
45 we got a messy job, we got more material over the joint than we got inside and we never filled the bottom. We had to make two different size shoes, so it will go in so far and the material will extrude to the bottom of the joint and build itself up and after building itself up, it comes out through the back and by having a filled joint in the back, then we could move the shoe, it would move the shoe ahead a little bit.

THE COURT: May I interrupt. In this exhibit here, No. 6, you have photograph 10, "Various types of shoes are used to meet demands for specific application." Now, does the character of the shoe depend upon the character of the joint?

THE WITNESS: Yes, very much so. Your Honor, in the winter time, slabs move away from each other.

THE COURT: They expand?

THE WITNESS: They expand to a point, they pull away from each other, you have got to get just about the right amount of material in that joint. We are allowing, a three-quarter inch joint will move, in severe weather, three-eighths of an inch; I have seen them move two inches.

THE COURT: Concrete?

THE WITNESS: Concrete. That is why I say the different types and sizes of shoes. You will notice in there the picture of one with a great big long plate, that is for a joint that has been -- I will say a
46 three-quarter joint that has been moved two inches or two and a half.

THE COURT: The moving of a joint would depend upon the depth, wouldn't it, too? How far the concrete goes down?

THE WITNESS: Yes, how far it goes down.

THE COURT: The deeper the concrete, the less the expansion?

THE WITNESS: You are right, usually the concrete has broken through down there and when we replace any of that joint material and run into anything like that, we fill up that concrete area that has pulled apart, with our spall repair material that we come out with just in the last four or five years and that will build up the same as the concrete and that joint is going to stay put. We go further than that when a joint is two inches or more; we will just allow for a half-inch joint and fill the sides of that concrete all the way up to the top level, then we can resort back to a narrow shoe, only a half-inch joint, because we have built up the joint so you won't need -- well, the material will only stretch so far. Now, by giving it only a half inch stretch, that material will go in there and seal the joint and all the way up to the top from the bottom, we usually allow an inch at the most.

BY MR. DOWELL:

Q. Did you indicate there was a relation between the thickness of
47 the tube and the width of the crack? A. Oh, yes, yes, in most cases. We allow just a little short shoe where we possibly can, in other words, it has got to be -- well, you take that shoe there, I couldn't turn around and try and seal an inch and a half, let's say an inch and a quarter joint, two inches, I would have material all over and I would have a messy job, that is why we use the real wide joint, we have one there, I think an inch and a quarter, one shoe with the long plate. Then from there, we found that this was slow, messy, and required more man hours to use

this shoe; it was perfect as far as the work was concerned but irregular on the finish and also the extra help that is required to trim down a joint and make sure that the joints are sealed at the top as well as the bottom.

Q. Why was it necessary to have the bottom of the tube open and the side? A. So that the material -- the joint has got to be filled from the bottom up. If the joint is half full, you are going to get seepage through the material somewhere up and down the line. You have an opening under that material that in the summer time, or if you get a rain in the spring, in the summer in the mornings, it is cool, the water will seep down in there and by 12 or 1 o'clock when that sun is really hot, I have seen joints puff and blow right out, there is a certain amount of steam reaction or chemical reaction that takes place.

48 Q. You said it has to be filled from the bottom up. Even though the material is inserted down through the top, it must be filled from the bottom up? A. That is right. Now, in order to make sure, and make our job easier and faster for us, we figured all right, we will get a shield. We adopted a shield on it -- this has been pretty well worn, but it answers the purpose. The shield has two purposes where we are concerned, one is to help pack it down so that the material can really pack in right, and the other is to seal the edges of the joint; the edges of the joint do not come up, straight up and down, they have a little taper on the top. Now, if you don't seal the edge of that little taper, water is going to seep through, the worst it will do, it will go through the pores, like this morning I showed that little piece of slab, because of the dampness still in the place, I said, here you are, you can pick this up with your fingers, but if it had been dry, you couldn't pick it up.

Q. Did you know any apparatus put out by Heltzel -- A. Well, I have seen some of it, but everything that I have seen has been mostly for laying concrete, treating joints while it lays it, and I have never seen any of his apparatus that could be used on a dry joint or dry concrete slab or for replacement, let's put it that way.

Q. I show you Heltzel 1,946,972 and ask you to look at Figure 24

and tell us whether or not the structure there could be used in accomplishing what you have described, that is, the filling of cracks with non-flowable material? A. No, emphatically not. In the first place, I understood here a moment ago there is a claim made that the shield here acts as a plane similar to this. It can't act as a plane, because that is the forward end of the shoe. If they tried to put that back --

THE COURT: What did you say?

THE WITNESS: That is the forward end of the shoe.

THE COURT: You said it cannot act as a what?

THE WITNESS: As a plane for the material or a shield to keep it from coming up. I would like to draw your attention to this, it will simplify a lot of matters. The shoe goes to the right of your page, this way, the shoe goes this way, if the shoe went this way and the material coming out there, here you have, this end of the shoe here would be digging up your material and your ramrod here would also do the same thing. You have no -- sure, this will clean up what is on top because you are reversing it, but you would have no material in your joint, in the first place. In the second place, this here shoe is behind -- in all of his designs, this will only half fill the joint, the top half. Now, on new concrete and liquid material, you can probably do it. The liquid will run down deep enough and probably as high -- as deep as they want near the top, but they
50 dare not do that on wet concrete because the material itself will lose its strength.

BY MR. DOWELL:

Q. I understand from what you said that there is nothing to touch the material after it is actually extruded, everything is ahead of it instead of behind? A. That is right, because in order to go over that with the shield he has mounted in the back, he would be tearing up all the material he has applied.

Q. Now, you indicate that you have used this material. Will you tell us some of the places that you have used it? A. Well, we did quite a bit of work at the New Castle County Airport. We had test centers also at the Pomona Naval Air Base at the time when they were there. We have

done over a year's work at the Glen Martin Company and they manufacture planes, we had to resort to this.

THE COURT: On the field there?

THE WITNESS: On their field aprons, runways, even their streets. Now, we have to resort to this heavy material here for the simple reason that those bombers that they put out have a tendency of throwing terrific heat, as I understood, near 1600 to 1700 degrees. Now, this, with our application, due to the fact that we did fill that joint in at the bottom and this shield did pack the tops, both sides of the top of the joint, we were
51 fortunate on; they made their tests with all that heat and the thrust of those motors and all it did on this heavy material, and thank the Lord the material was heavy, was raise a million little pinnacles down the joint, because one engine was dead on it. And I thought truthfully, if this is a test, if this stuff is any good, this is it; if it isn't, I am leaving. And there happened to be a vice president there, William Seeman came out and he said, "Charlie," he said, "see what is left." We went there and I saw these million pinnacles here. I said, "Fellow, you got all of it here, you have got a whole lot of mountains in it." He said, "Boy, that is it."

BY MR. DOWELL:

Q. Did he find that satisfactory or not? A. They were tickled pink.

THE COURT: I didn't get that.

THE WITNESS: They were satisfied.

THE COURT: You said tickled pink?

THE WITNESS: Tickled pink. What I mean to say, they really appreciated the work because if they hadn't, they wouldn't have given me the other five or six contracts.

BY MR. DOWELL:

Q. Name some other installations you made. A. We made an installation prior to this one job there for an asphalt company in Baltimore, Baltimore Tile & Asphalt people. We did some work for -- like I

52 said, we did some work for the Pomona Air Base.

Q. Did you do any work in Atlantic City? A. Well, that is at the Pomona Air Base, we had a contract there, we were successful in getting a contract, but when the Navy moved out and Nayfac moved in, we had, I think the contract there was about \$19,000.

Q. Who else knows the work you have done on this? A. Well, several people, all the engineers at Glen Martin.

Q. Anyone in this courtroom? A. There is one man there, superintendent of the New Castle County Airport.

Q. What is his name? A. Walter Newton, he has helped me and we have helped each other, in other words, making tests we are interested in doing, putting the best in the joints there.

Q. Do you recall other airports in which you have made these installations? A. We made test plots for the National Advisory Committee of Aeronautics at Langley, we made tests there; in fact, we were called in on our reports.

Q. You have mentioned two types of nozzles, one without any rib at the rear or side structure and others with the lateral plates. Have you used one or both of these? A. Yes.

53 Q. That is correct? A. Both. We have even used them with half a plate, we have to go up along a building.

Q. Are you familiar with competition -- A. Yes.

Q. Are competition using either of these? A. Two of them are, yes.

Q. Well, now, tell us something about the durability of this type of joint. A. Of the type joint?

Q. The durability of it.

THE COURT: I would conclude from what has been said, and there is no evidence to the contrary, that presumably the joint is durable. The only question is, is the device, the apparatus which produces the result, invention?

MR. DOWELL: We will terminate that part of the testimony.

THE WITNESS: Well, I will tell you frankly, going back to the old pipe, no good, you could never make a nickel out of it. Even with this, you couldn't make much money, you might make expenses, but I did a perfect job, it was a good job, for time, speed, efficiency, I had to resort to this, in other words, we kept adding, adding things on.

THE COURT: You have opened up this subject. From the stand-
54 point of the job, how much, with reference to durability of the work done, does the material contribute?

THE WITNESS: The material, Your Honor, there has been -- I am sorry I don't have them here -- no less than 35 people got in touch with us, will we handle their material, will we handle their material. We know that you have the equipment that will do it; they can't. I didn't want to make equipment, I wanted to buy, I went all over, I couldn't find any equipment to buy.

BY MR. DOWELL:

Q. I wonder if we could bring this down to about one question. I think His Honor is undertaking to arrive at a decision on whether or not the type of material that you use, namely, the material that is very heavy and thick or viscous, mastic, if that plays an important part or if you could use a liquid material instead. A. No, no, you have got to have, in order to get a perfect job, you have got to use a heavy material that will take heat resistance and elasticize to stay together.

Q. Then the apparatus that is employed, will the same apparatus use both materials or can you use the same apparatus on the flowable material and the non-flowable? A. Yes, you can.

Q. No, can you use the material -- the apparatus that is ordinarily used on the flowable material, can you use it on this heavy viscous, non-
55 flowable material, or does it take special apparatus? A. No, the apparatus that uses a flow type of material will never handle material like that, never.

Q. Then it does take special apparatus? A. Definitely, very much definitely.

THE COURT: All right, thank you.

MR. DOWELL: You may cross-examine.

CROSS-EXAMINATION

BY MR. KREIDER:

Q. Mr. Gross, you mentioned that the rearward opening in your nozzle tended to cause the nozzle to go forward, to be pushed forward by the material being extruded, is that correct? A. Yes, it has a certain amount of pressure.

Q. All right, look through the application very carefully; I am unable to find where that is described. Would you tell me whether that actually is described in your specification? A. Well, by the shoe moving forward doesn't mean that much to the job, because it will do that anyway.

MR. DOWELL: We say it is inherent, regardless of whether it is shown in the application. I don't think he knows.

THE WITNESS: We didn't think it was that important, whether it has the motion of the shoe or anything in it. What I am trying to say is --

56 THE COURT: Now, you didn't prepare your application, did you?

THE WITNESS: What did you say?

THE COURT: You didn't prepare your application?

THE WITNESS: No.

THE COURT: Counsel prepared it for you and counsel says it is not in there in actuality, but it is in there inherently.

MR. KREIDER: That satisfies me as far as that question is concerned.

BY MR. KREIDER:

Q. Your apparatus is disclosed as being drawn forward to some extent by the cutter member, is that not correct? A. It has a certain amount of pull power on the cutter but it can be pushed itself or held back, whichever is necessary.

Q. And is it also disclosed that the wheels of your vehicle may be driven to advance the apparatus, is that not correct? A. They can be regulated, the speed, with a clutch.

Q. I will hand you a copy of Heltzel patent No. 1,946,972, I believe you, referring to Figure 24 there, I believe you said that this equipment could not be used to refill a joint. A. Oh, yes, wait.

* * * * *

57 Q. I believe you indicated you could not use that apparatus to refill a joint or fill a dry joint. Would you tell me why? A. In the first place, this has no way of removing the material out of your joint.

Q. Let's suppose the material has already been removed, we want to fill it. A. If you mean you have an open joint?

Q. That is right. A. All right, let's see, if this is the depth of the joint down here --

Q. Well, wouldn't it be obvious to make your nozzle of such a size as to extend to the bottom of the joint? A. No.

Q. It would not be obvious to you? A. No. You can, but it is not necessary. If you have both openings there, your material is forced through, naturally, the law of gravity, we will say works this way and
58 out that way, the force of less resistance and the material is going to go out.

Q. You have gotten off my question. I would like to know why you cannot use that construction to fill a dry joint that has been cleaned out, if that is the case. A. I will give you your answer there, with a dry material?

Q. No, with a semi-plastic material under pressure? A. Soft material, very soft?

Q. Not necessarily very soft, it can be one that requires tremendous pressure as we mentioned the other Heltzel patent disclosed. A. Your shoe is the form of your material, that is your mold for the material you are going to extrude.

Q. Why can't we use this? A. Because it is sealed on the bottom and the best you are going to get here is just a ribbon the width of your opening.

THE COURT: When you say, "why can't it be used?" don't keep it a secret, I am looking at the exhibit, too.

BY MR. KREIDER:

Q. You say the fact it is not open at the bottom is the reason you could not use that, is that correct? A. That is true. I will tell you why, if this joint is an inch and a half deep, the opening on your shoe is
59 only a half inch and the outlet is on the back, you are not going to cover that bottom inch.

Q. Wouldn't it be obvious to make the nozzle of a size adequate to supply enough material to the open, clean, dry joint? We have to make it wider, make it wider. A. You mean wider this way?

Q. I am trying to find out why you think that can't be used to fill a dry joint. A. I will give it to you brief, you are going to get your pressure on the side, you are not going to get any pressure to lay in the bottom, you don't have anything in there that will allow the pressure to come on through the bottom; all of this is just the pressure coming out here and it is going to give you a ribbon effect. If you fill the joint up here, you are still not going to get down the bottom, because there is nothing to keep the material coming out on you.

Q. I believe you have answered it. You answer because the bottom is not open, is that right? A. That is right.

THE COURT: When you say "use this," you mean the design as exhibited in Figure --

MR. KREIDER: --Figure 24, of course, having in mind obviously removing anything there that is for the purpose of using it in wet concrete only.

* * * * *

62

STANLEY W. CROSTHWAIT

called as a witness by the plaintiff, being first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. DOWELL:

Q. Please state your name, your age and business. A. My name is Stanley W. Crosthwait. I am 61 years old, I am at the present time a consulting engineer.

Q. How long have you been in your present capacity? A. For approximately two years.

Q. What did you do before that? A. I was Assistant Commissioner of the Bureau of Reclamation, Department of Interior.

Q. And before that? A. Before that I worked in various other offices in the Department of the Interior.

Q. What, if any, connection have you had with aeronautics?

63 THE COURT: May I ask, Mr. Crosthwait, are you an aeronautical engineer?

THE WITNESS: I have a degree in electrical engineering.

THE COURT: And from what institution?

THE WITNESS: From George Washington University.

THE COURT: All right.

BY MR. DOWELL:

Q. What, if any, association have you had with aeronautics?

A. I have been associated with aeronautics off and on for approximately 30 years. I was with the Bureau of Air Commerce that used to be the aeronautics branch of the Department of Commerce when it was originally established. I served there for approximately ten years. I have maintained an active pilot license from that time to date, still fly my own aircraft.

Q. Then it has been your experience to come in contact with various airfields, is that correct? A. I have visited, either as a civilian pilot or when I was in the Air Force, fields all over the world.

Q. Now, Mr. Crosthwait, I gave you a couple patents this morning and asked you to examine them and you have spent a large part of the day doing that, I believe, is that correct? A. That is correct.

64 Q. The patents I refer to are the two Heltzel patents 1,946,972 and 2,636,425; is that correct? A. That is correct.

Q. I believe you dropped the other one, you had it, I noticed you dropped it out of your hand a moment ago. You are also familiar with the application, at least the nozzles of the application, I believe introduced in evidence here today, is that correct? A. That is correct.

Q. What was the question that I propounded to you when I gave you these copies of the patents? A. You asked me to read these to see if the apparatus described in these patents could perform the functions that have been claimed in the patent under consideration.

Q. In other words, as an independent engineer, I asked you for that service? A. That is correct.

Q. Have you formed a conclusion on this? A. I have.

Q. Will you state what it is? A. My conclusion, after reading these two patents that have been referred to by Heltzel, is at first they are primarily designed for use in concrete that has not set or become hard. There is nothing that I could find in the description of the apparatus
65 or in the items that are claimed, to indicate that they are intended for use in repair work or work of placing suitable material in cracks, either cracks made through weathering or otherwise. Each of the patents repeats, time after time, the statement that they are intended for use in concrete that is in fluid state. I would therefore conclude that, for the most part, it would be quite difficult to use the apparatus described for work in concrete that has set or become hard, without considerable modification of the equipment and a deep deviation from its intended use.

* * * * *

CROSS-EXAMINATION

BY MR. KREIDER:

Q. I understood you to say that the nozzle construction in the Heltzel patents would require considerable modification to use them in
66 a dry joint to refill a dry joint? A. That is my opinion, yes.

Q. Let's take as an example Figure 24 of 1,946,972, which you probably have in front of you now, would you specify just what modification would be necessary to use that in a dry joint? A. Well, in that figure, in the first place, the blade 56t, designated in the drawing, the purpose of it is to make an opening in the concrete, that is stated as the purpose of it in the patent.

Q. Yes, but I asked you what changes would have to be made.

A. It seems to me that would have to be eliminated, to start with.

The fluid material is fed out of the rearward part of what we might term a nozzle, not designated but adjacent to 36t. That nozzle, no definite proportion of width is given, but it is presumed that it must fit down into the crack. It does in this instance fit into the crack that has been generated by the piece 56t. So that then this would have to be changed so that you would have a different type of nozzle, particularly as to its width.

Q. Well, now, let me ask you, of course you mentioned the purpose of 56t was to remove coarse aggregate, and so forth, from the path. If we were going to use this in an open gap that didn't have any coarse aggregate in the way, it wouldn't require a great deal of intelligence to figure that that should be removed, would it? A. No.

Q. Now, as far as the width of the nozzle, which might be designated 36t, is concerned, certainly people working in this art would be capable of increasing the width of a nozzle with increases in the width of the gap to be filled by it, wouldn't that be so? A. That would also require that the void being filled be straight, that it not be composed of a lot of curves and irregular sides, because this is dragged through the hole and even if it had an opening on the bottom, it would still have to be dragged through the hole unless you considerably altered that design.

Q. Well, now, let's get back to it, we won't argue that point, but suppose we have a straight gap but the gap is wider than the particular width of the opening, of the member 36t here. Wouldn't it be obvious to prepare a nozzle of a greater width? A. Yes, I would agree with that. You could, of course, completely redesign it, too, and come up with a nozzle similar to the one we are discussing in the current patent.

Q. Have you given me all the modifications? A. The other one is that you would have to have some following object attached to this nozzle, if you are to spread out or to press down any of the excess material that might be forced through that contraption.

Q. Now, you were speaking of in back of the nozzle as it is moved along, is that correct? A. Yes.

Q. Well, I believe you are familiar with the application, at least to some extent. I have in my hand here Exhibit 4 of the Plaintiff, that has no means in back to press down? A. That is correct and it has very limited use.

* * * * *

WALTER I. NEWTON

called as a witness by the plaintiff, being first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

THE COURT: This is Mr. Walter I. Newton and you are the Superintendent of the New Castle County Airport, Delaware?

THE WITNESS: That is right, that is the airport at Wilmington, Delaware.

69 BY MR. DOWELL:

Q. Tell us something of your duties and background. A. Back in the twenties I was a road builder with my father-in-law; in 1929, I took over the business and operated as a road builder until 1932 when things went so black that there was nothing in existence. From that time on, I worked at most anything that would make a dollar until 1940 when I became associated with the Highway Department of Delaware and stayed there until September of 1942. I then applied for the job as Maintenance Superintendent of the New Castle Army Air Base and operated in that capacity until 1946, August the 9th. At that time I was relieved from the Government service and the airport was in turn turned back to the county and I continued on in the same capacity as Chief of Maintenance from August 12, 1946, until the present date. That gives a pretty complete picture.

THE COURT: Well, it doesn't leave much for the imagination.

THE WITNESS: No, that is right.

BY MR. DOWELL:

Q. You heard the testimony here today. State whether or not you are acquainted with Charles P. Gross. A. Yes, I am very well acquainted with Mr. Gross.

Q. How long have you known him? A. Since about 1951 or 1952, along there somewhere.

70 Q. What has been your experience, insofar as we are here concerned, with Mr. Gross? A. I have always found him to be a reliable contractor, in fact he has worked under my jurisdiction and I have known of work that he has done on other places besides working for me.

Q. By "working for me," what do you mean? A. The New Castle County Airport is now operated by the levy court. By levy court, I mean the same thing as you have in other states as County Commissioners. Delaware operates under the old system of hundreds and Mr. Gross was low bidder on a job of taking care of the joints on the New Castle County Airport in 1954.

Q. What type of work did he do on the airport there? A. You mean as to quality or what?

Q. No, the nature of the work. A. Back in 1947 or 1948, the jet problem became apparent. By that I mean that a jet is what we might term an oversized blow torch. A blow torch hitting toward the pavement would create a heat on the pavement and, at the same time, a jet airplane, the orifice of the jet, is toward the pavement and it creates a terrific heat on the pavement. Back in 1947 or 1948, the New Castle County Airport was leased in part to the Air Forces and at that time we had the F-84 and the F-84 were jets which threw at least 350 degrees of heat onto the pavement and I became well aware that something would happen
71 if we didn't have some means of combating the heat and the blast of these jet airplanes, as far as maintenance of the concrete aprons was concerned.

Q. Have you anything to illustrate the effect of that blast on the pavement? A. I believe you have in your hand some pictures. As you see here --

THE COURT: Is that going to be introduced in evidence? That may be marked as Plaintiff's No. 7.

MR. DOWELL: Number 7-A, 7-B, 7-C, 7-D, and 7-E.

THE WITNESS: I think these two answer your question.

MR. DOWELL: All right, A and B, then.

(Two Photographs of airport runway
were marked Plaintiff's Exhibits
Nos. 7-A and 7-B for identification.)

THE WITNESS: Any material which has to be melted to be applied into the joint, the same heat through an exterior application will dissolve that joint and the blast of the jet airplane will, in turn, blow this material out of the joint. So, through experimentation, a lot of hard work, to get this new method of applying material into concrete joints, it took at least two years to get that through the bureaus in Washington, through CAA and the Federal Government, then after we had a material which would stay in the joint, the problem of getting some equipment to put it in was the next problem. That is where Mr. Gross entered the picture.

72

BY MR. DOWELL:

Q. What are those two photographs, Exhibits 7-A and B? A. Those two photographs represent the ordinary material, the material which is heated to pour in the joint, which in turn is blasted out by the heat of the jet planes.

THE COURT: You mean it overflows, so to speak?

THE WITNESS: It just blows right out.

THE COURT: The dark area there in 7-A?

THE WITNESS: That material was at one time in this joint, the action of the jet would cause this to blow out.

THE COURT: I see, all right.

BY MR. DOWELL:

Q. In other words, the jet heated it and blew it out after it became fluid or liquid? A. Blew it out. It is not safe to stand within -- those particular jets -- within a distance of 300 feet, you will get burned and the jets we have today, I wouldn't want to stand within seven or eight hundred feet of them.

Q. You stated that is where Mr. Gross came into the picture. What did Mr. Gross do? A. Mr. Gross was in the roofing business and he was looking for work as far as roofing contracts and I mentioned this problem to him and he became quite interested with the possibility that

there was a new field of endeavor opening. So he and I both worked on
73 this problem of finding a machine adequate to put a heavy material
in the concrete joints.

Q. Now, you heard Mr. Gross testify with reference to Plaintiff's Exhibits 4 and 5, I believe, this morning. Are you familiar with these nozzles? A. I think so.

Q. Plaintiff's Exhibits 4 and 5? A. Yes.

Q. Will you tell us whether or not you have seen these operated?
A. Yes, I have.

Q. What was the result? A. This Exhibit 4 was probably one of his first applicators. He found out that it was rather an expensive problem to try to use this to gain any time. The material would extrude out, but you had no means of finishing the material as it came out in a ribbon, filling the joint from the bottom up. So after a lot of experimentation, a design similar to this was evolved. That acted as a wiper on the -- we all know from physics that an action downward has the same action in the opposite direction, in other words, you had this shoe being pushed up by the material that was being pushed down. This opening in the back, the material will come out the back but it also, by coming out the back, has a tendency to push the shoe ahead, which gives you a combination of resultant forces of pushing up and pushing ahead, finishing the joint with
74 this extruded convex surface, as we explained previously.

Q. Can you operate, still, the first nozzle? A. You can operate it this way, but you will find it gives a very poor finished work and I doubt very much if an inspector would pass a job that was put in by a joint similar to this; it can be done.

Q. How about the length of time and the material? A. A considerably longer time is involved in using this (indicating) than this type.

Q. How about the quantity of material? A. There is a considerable wastage because you cannot --

Q. With Exhibit 4? A. With Exhibit 4, because you cannot control the overflow.

Q. Now, you heard something about a spalled joint. Will you explain what a spalled joint is, if you happen to know? A. I can show you from some photographs I have there, that would give you a better picture, if you will excuse me just a moment (leaving stand).

(Back on stand.) You no doubt have seen on highways conditions around a joint which look like that (indicating), that is the concrete lifting through frost action, heat action, and the movement of the pavement itself. Here is another one, similar.

75 Q. Now these photographs, Exhibit 7, were made at your direction, the two photographs 7-A and 7-B? A. Yes, I was responsible for those and Mr. Gross and I took these photographs.

THE COURT: Let me ask you, then what is exhibited in photograph 7, namely, this material which you say was heated to the fluid state and then blown out --

THE WITNESS: That shows you what will happen with the ordinary hot material.

THE COURT: Those are spalls, aren't they?

THE WITNESS: No, that is merely material which has been heated and put in the joint.

THE COURT: Then, a spall is the cracking of the concrete itself, is that it?

THE WITNESS: Let's say, here is your crack, the edges leading to that crack --

MR. DOWELL: Deteriorate?

THE WITNESS: -- deteriorate.

THE COURT: Become fissured and deteriorate, that is a spall?

THE WITNESS: That is a spall, let's say a surface failure next to the joint.

THE COURT: That is what Mr. Gross said this morning.

BY MR. DOWELL:

76 Q. You are also responsible for these two photographs you just handed me.

MR. DOWELL: We offer 8-A and 8-B.

THE DEPUTY CLERK: Plaintiff's Exhibits Nos. 8-A and 8-B for identification.

(Two photographs were marked Plaintiff's Exhibits Nos. 8-A and 8-B for identification.)

BY MR. DOWELL:

Q. Now, Mr. Newton, you have heard some testimony about a couple patents here, Heltzel patents. Have you glanced at these patents or examined them? A. Hurriedly this morning, I examined those papers.

Q. Will you tell us whether those patents are capable of performing -- the structures of those patents are capable of performing the function for which Plaintiff's Exhibits 4 and 5 can operate or perform?

A. I don't think these Heltzel patents have any bearing on Mr. Gross' ideas at all.

* * * * *

77 THE WITNESS: In the first one, 1,946,972, it speaks of this as a combination machine to open up the semi-plastic material or material which hasn't hardened for the insertion of a plate or a metal, and also for the filling of a joint. The machine, as far as Mr. Heltzel goes, I have never seen the machine used for the one purpose of opening up a joint for the putting in of a steel plate. He mentions here that it is a costly proposition as the way it is being done, but I have never seen this machine used in any place for that purpose. However, the machine is used today for the other purpose of putting in a dummy joint. Longitudinally, on a concrete road, you will have an expansion joint to take care of the expansion and contraction over a long period, let's say a thousand feet, but in between that expansion joint and the next one, you will have dummy joints. Now, this patent, there is a machine built called the Flex-O-Plane, which opens, as is shown here on the --

BY MR. DOWELL:

Q. Is that the earlier of the two patents? A. Probably the combination of the two, I haven't gone into it that carefully, but there is a means of displacing the coarse aggregate and putting a filler strip in the opening left by the driver.

78 Q. Well, now, there has been some discussion here or some question about the type of joint. Are those joints of uniform depth or are they straight, or explain the types of joint that you have known in your experience. A. Well, on new work, this dummy joint that I speak of, put in by the Flex-O-Plane outfit is installed one-third the thickness of the pavement. On expansion joints, there is a pre-molded filler that goes in at periodic distances. When you get into refilling of joints that have been filled previously, your quantity may vary considerably. For instance, on the job Mr. Gross did at New Castle in 1954, I wrote the specifications and called for the joint to be filled completely from the bottom up.

Q. Why? A. Because I felt that it was necessary to get those joints completely filled to keep the water from the bottom and from the top of the pavement. However, the quantities that I figured, figuring that those joints were of a uniform depth, I was all wrong, but fortunately for the contractor's sake, I had put in a gallonage price rather than a per foot price and instead of using 2600 gallons of material, that job actually took 4443 gallons, so it shows that the joints were not of a uniform width and a uniform depth.

Q. Now, what type of filler was used to fill those joints? A. I
79 believe you called for an exhibit over there, it is a very high viscosity material which has no flow whatsoever, either at zero degrees or 150 degrees fahrenheit.

Q. I show you Plaintiff's Exhibit 3, is this the type of material?
A. That is the type of material that was used at New Castle Airport, very high viscosity material.

Q. Well, now, referring again to these two patents, Heltzel patents, what type of material is supposed to be used in those patents? A. It says in here a plastic or a semi-fluid material, in these introductory pages here. I don't know where it is now, but it speaks of it designed for putting in after the concrete has been poured and while still plastic, in a joint or traffic line, or a combined joint and traffic line.

Q. Well, now, what would you have to do to use this heavy mastic or filler with the devices of those patents? A. With those patents?

Q. The devices disclosed in the patents. A. I would hesitate to even think about doing it, I don't think it could be done.

Q. Wouldn't it be obvious to just open the bottom of it in Figure 24, wouldn't it be obvious to open the bottom of the discharge nozzle?

A. And then what?

80 Q. And use it for this heavy material. A. Well, I wouldn't want to take the job of doing it, I don't think a man could even consider doing it.

THE COURT: The question was, wouldn't it be obvious, if you intended to do it, that that was the way to do it?

THE WITNESS: This machine is not designed for that purpose, in the beginning, I'd say that.

THE COURT: Your answer, then, is it wouldn't be obvious?

THE WITNESS: What did you say?

THE COURT: If you are familiar with the mechanism, it would not be obvious, is that what you are saying?

THE WITNESS: I say it wouldn't be practical to use a machine designed for a light viscous material, to be used in a question of this kind.

THE COURT: Counsel's question is, would it be obvious, if you wanted to do it?

THE WITNESS: Would it be obvious to do it or not to do it?

BY MR. DOWELL:

Q. To change this, take the bottom out of that thing so it could be used for the same purpose? A. Well, this patent calls for it being closed at the bottom.

81 Q. I know, but my question is: Do you think it would be obvious to do that, for anybody to take that, all they would have to do was cut the bottom out. A. I couldn't answer that question. I don't really know. But I do know that that would be comparable to what we have here.

THE COURT: You wouldn't do it?

THE WITNESS: I wouldn't do it. You would have comparable to what we have here, an open joint with nothing to finish it off, nothing to keep the material from extruding out; it could be done.

BY MR. DOWELL:

Q. Where is the flange, which way does the flange extend on that Heltzel patent 1,946,972?

THE COURT: Are you talking about Figure 24 still?

THE WITNESS: On Figure 24, that flange is on the forward of the finishing outfit for the purpose of making the joint.

* * * * *

THE WITNESS: 37t is for the purpose, in this case, of making the finished joint itself and not for finishing the material which you
82 would put in the joint.

THE COURT: All right.

CROSS-EXAMINATION

BY MR. KREIDER:

Q. You have Heltzel patent 2,636,425? A. Yes.

Q. Would you refer to the first page of the specification. I will read you the fourth paragraph in the first column:

"Among the new developments of joint sealing materials are substances which are semi-plastic and resist flow through the conventional joint installation devices in that these substances require comparatively great pressure to project the same through the mechanisms in order to form the proper section of joint material as it emerges from the installing device and into the plastic concrete of the road."

Don't you agree that that discloses using a very stiff material for the filler? A. It probably does, but still again they speak of the concrete as a plastic concrete. We are not talking about a plastic concrete.

Q. I didn't ask you that, I said doesn't that refer to a stiff filler material? A. It does.
83

Q. Now, I would like you to also go back to the drawing of this patent and take a look at Figure 4. You will notice, about the center of the drawing, the nozzle extending rearwardly, it has no number on it. A. Yes.

Q. And the material 98 is being extruded from it. Won't you agree that material, extruded from that nozzle, will have a downward force as well as a rearward force? A. No. You wouldn't in this case, because --

Q. It does not have a downward component of force? A. No, it does not; well, downward to some extent, but there is nothing to react the downward pressure and the upward pressure.

Q. This member is being held substantially rigid on a piece of machinery, as I understand it, the tube member, the nozzle member? A. All right, what is going to stop it from coming up as well as going down?

Q. I didn't ask you that. A. I am asking you.

Q. I am supposed to be asking you questions. A. There isn't anything to stop that from coming up as well as going down.

84 Q. Let's get back to my question. My question was, doesn't the material extruded out of there, and the patent uses the words "comparatively great force," enormous pressure, doesn't the material extruded out of there have a downward component as well as a rearward component of force exerted on it? A. You have a combination of forces on it.

Q. That could be answered yes, or no, I believe. A. All right, there is a partial downward, you have a component of horizontal as well as downward and you have a resultant force on an angle.

Q. The answer is yes, you do have a downward component? A. To a point, let's not say it is a downward pressure, it is a downward partial pressure.

Q. Do you have a downward component, yes or no? A. Yes.

THE COURT: You are getting into semantics now. Is that all?

MR. KREIDER: That is all.

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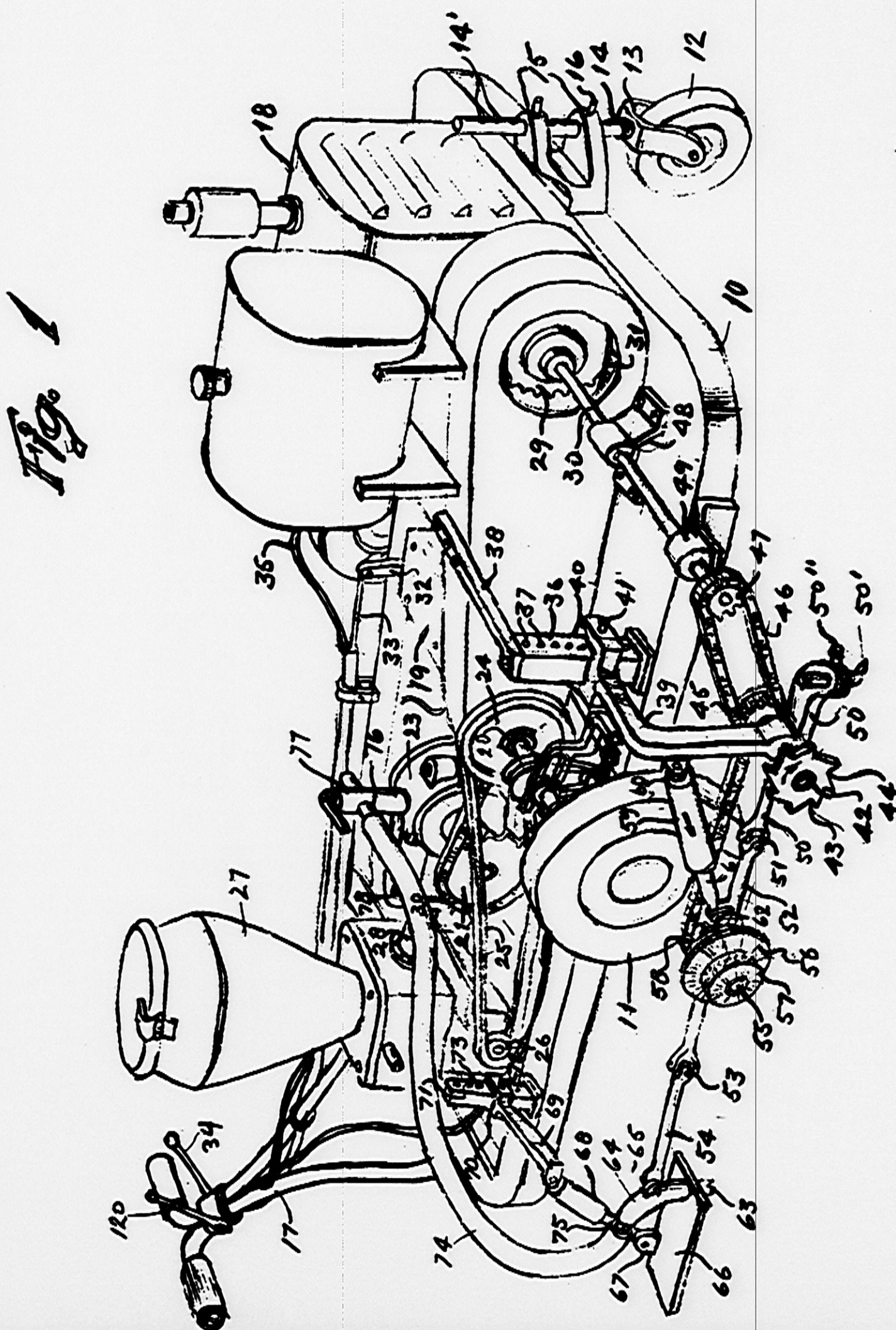
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PLAINTIFF'S EXHIBIT 1

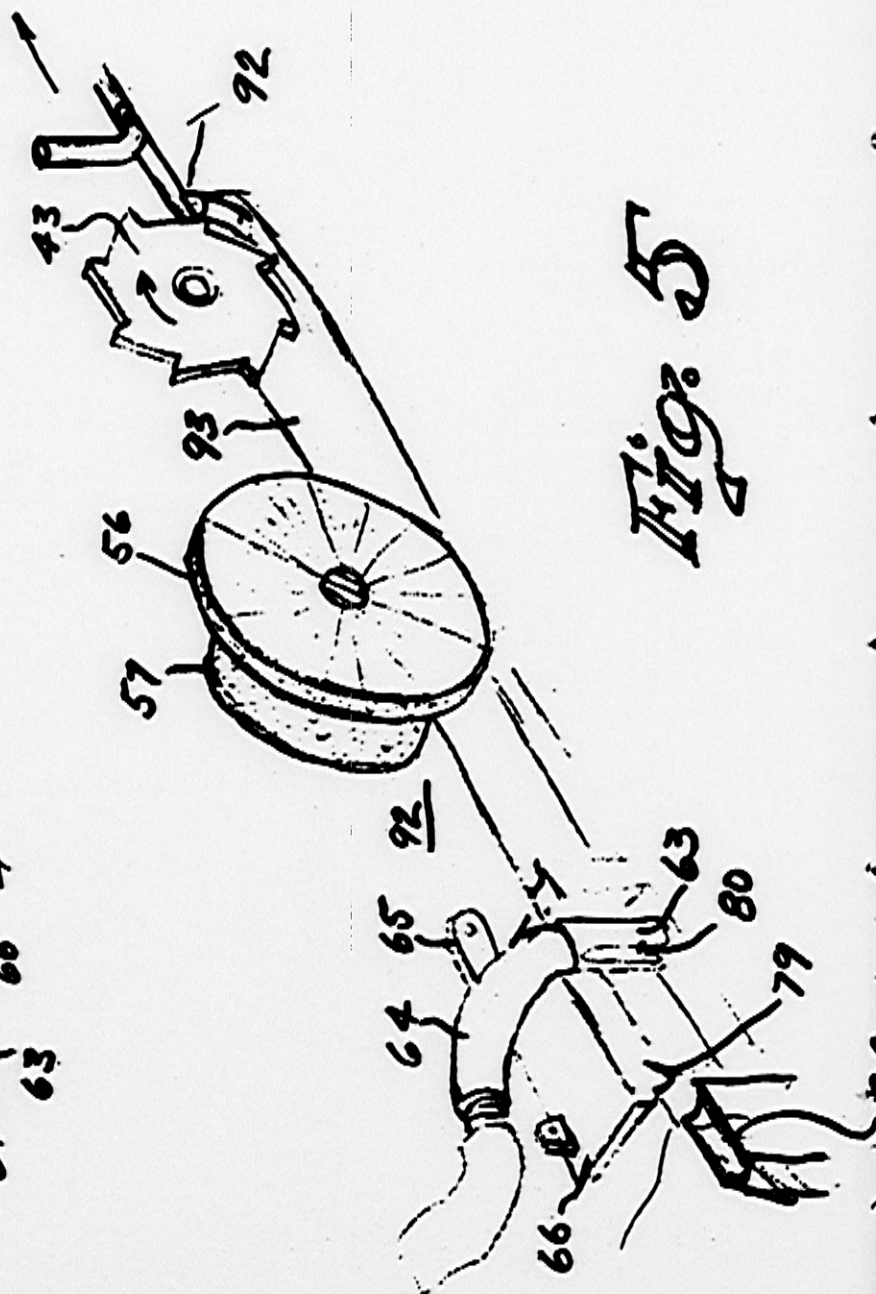
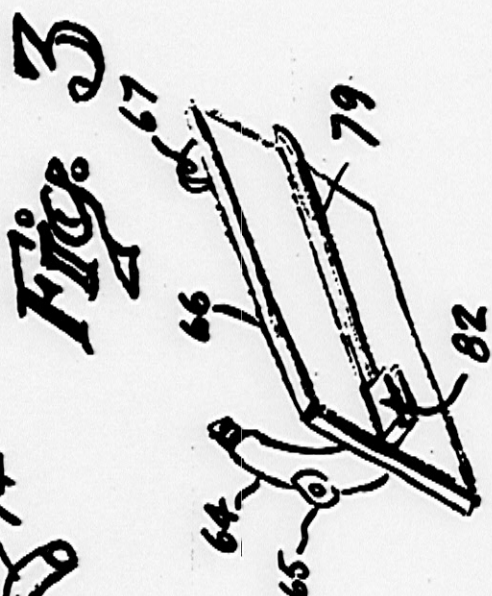
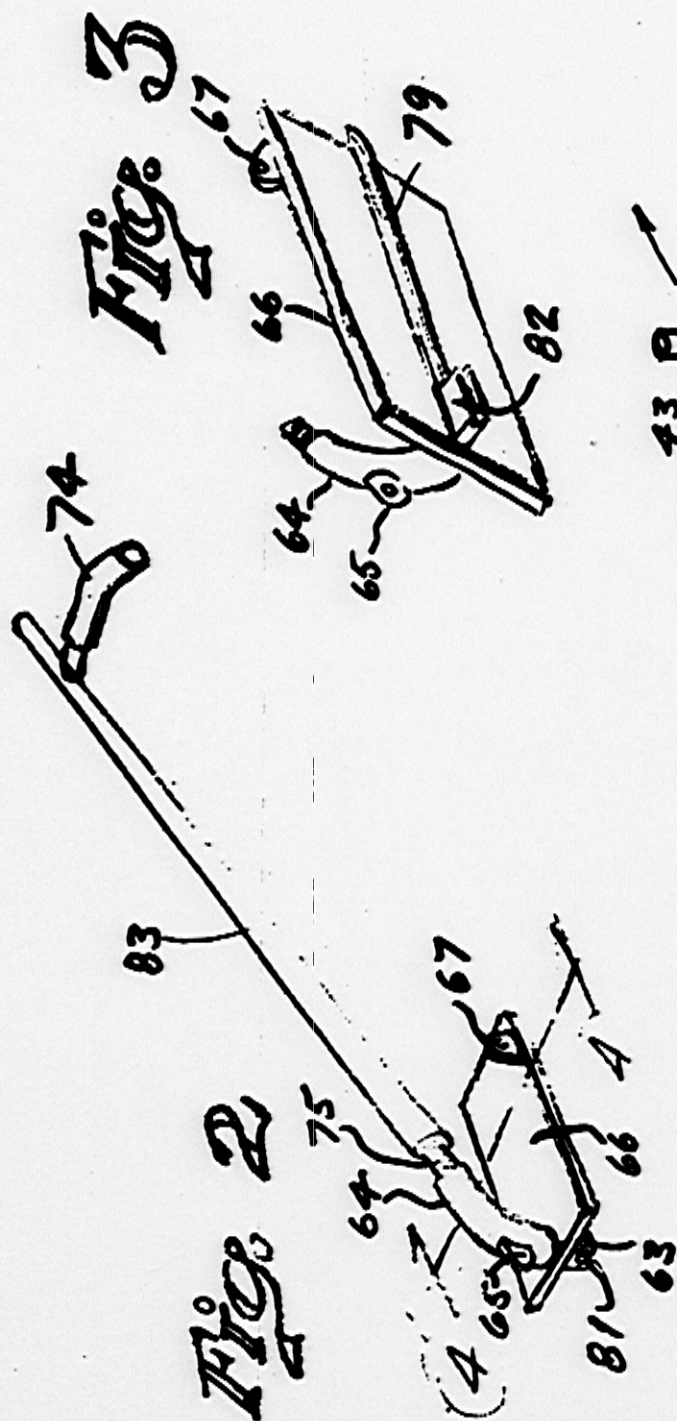
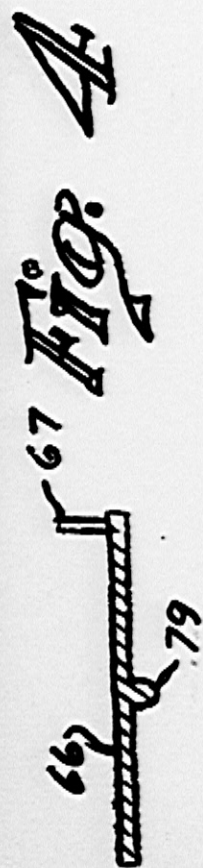
APPLICATION DRAWINGS

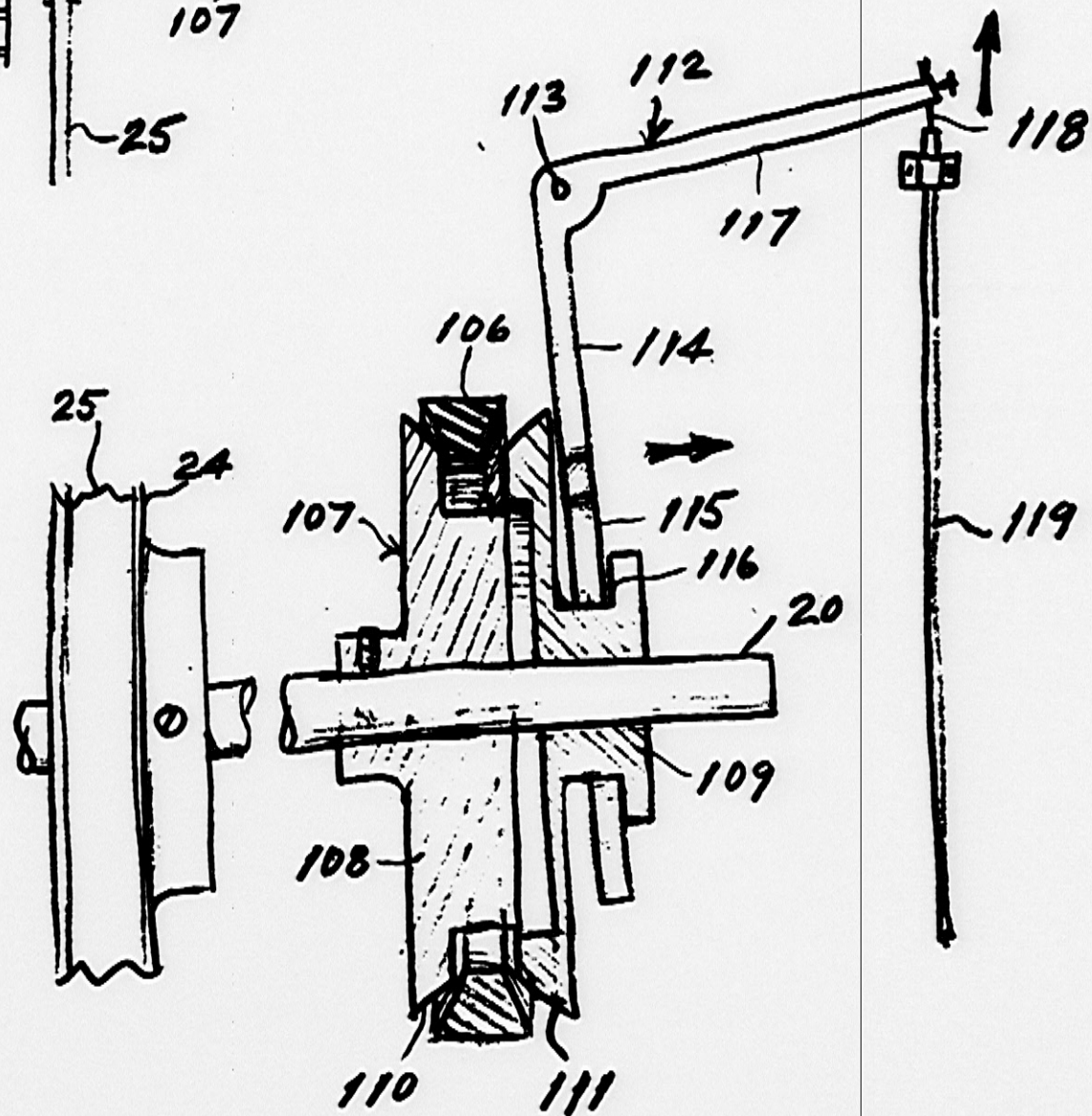
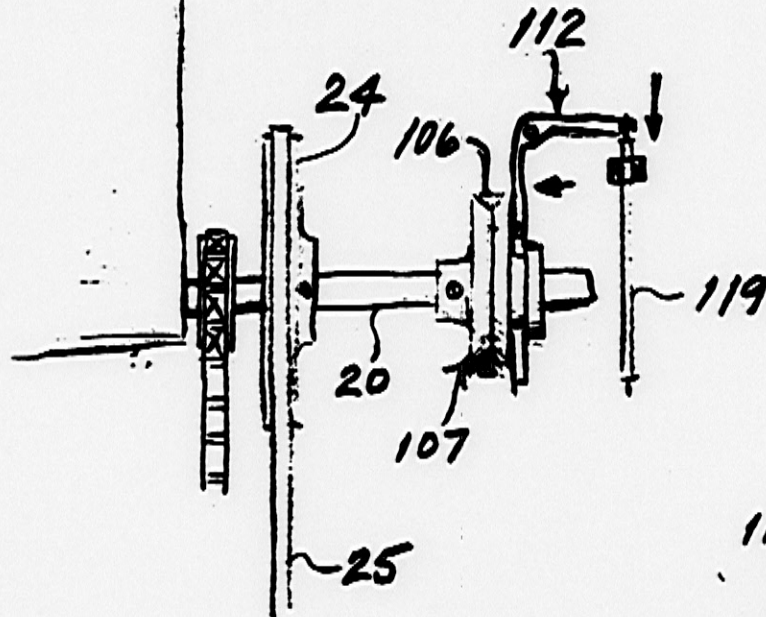
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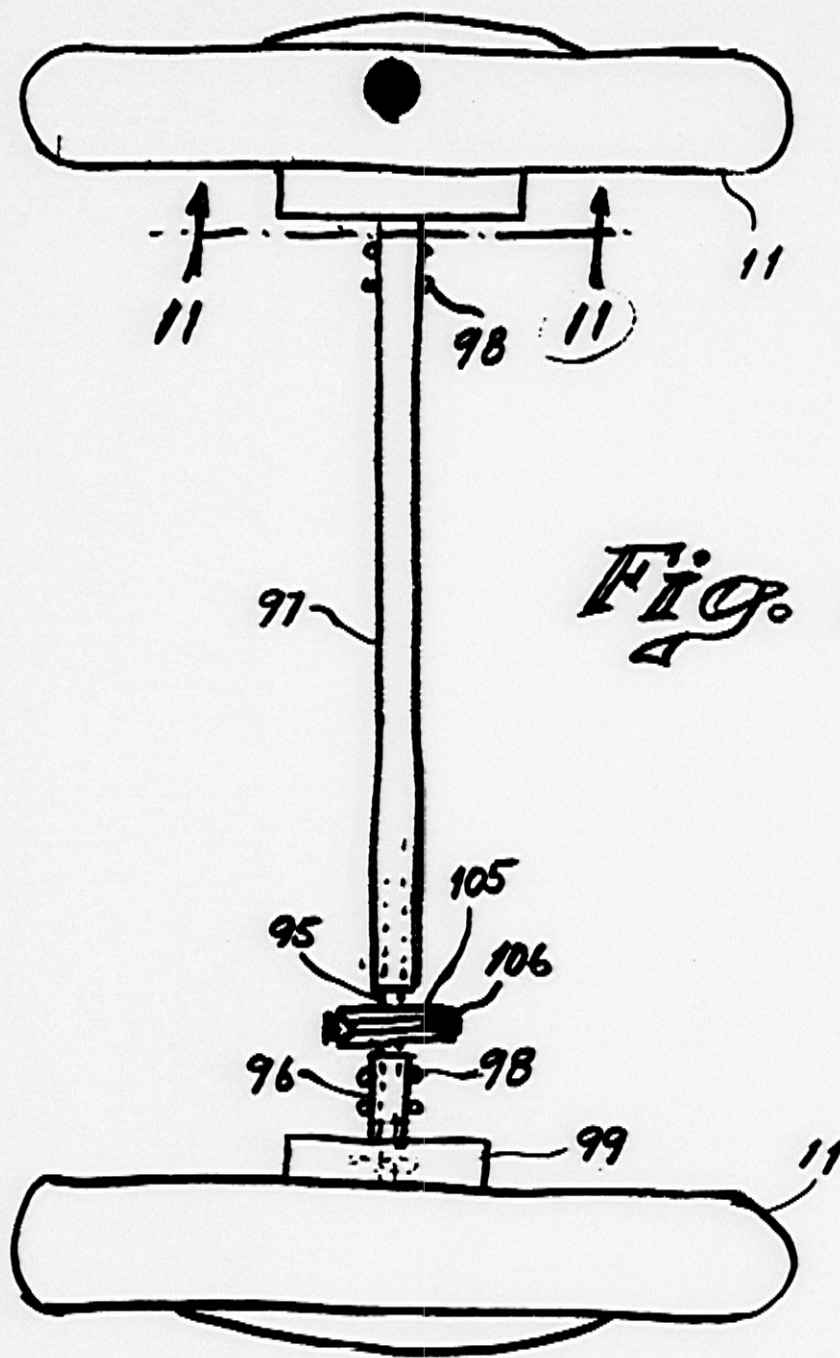
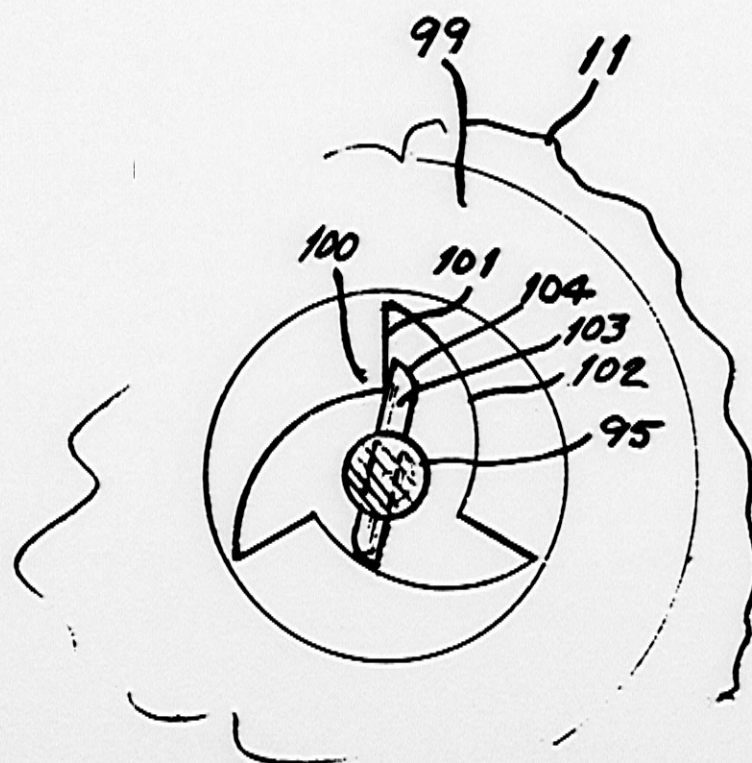
INVENTOR
CHARLES P. GROSS



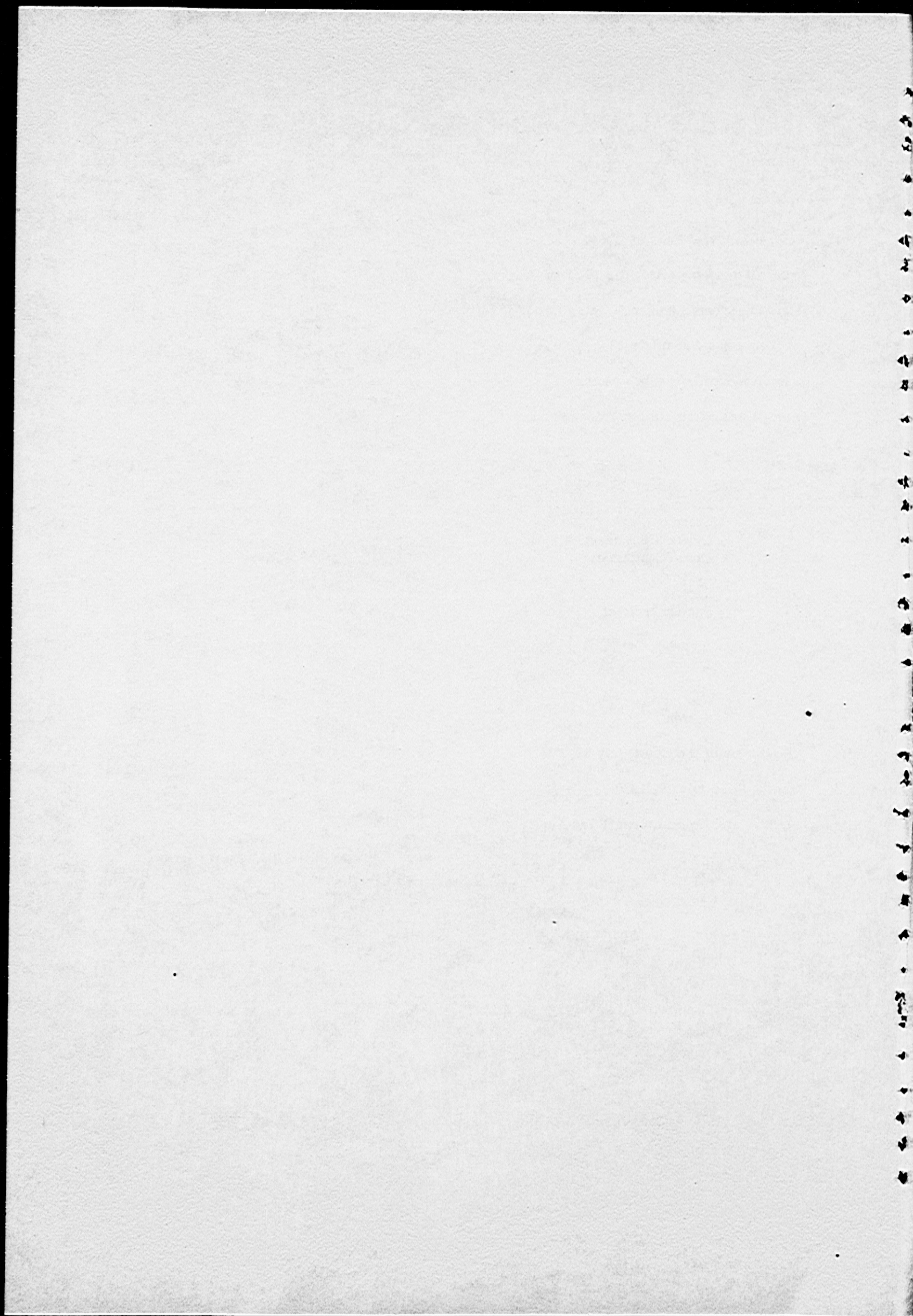
APPLICATION DRAWINGS
(Sheet 2)



APPLICATION DRAWINGS
(Sheet 3)*Fig. 8**Fig. 9*

*Fig. 10**Fig. 11*





EXCERPTS FROM
PLAINTIFF'S EXHIBIT 1

Specification and Drawings of the
Application for Patent in Suit

This invention relates to concrete and other structures such as roadways, runways, walks, and the like, wherein expansion joints are provided to allow the concrete to expand, and such joints are filled or sealed with material which permits relative expansion and contraction occasioned by temperature changes, but maintains the joints sealed or sufficiently tight to exclude water from the joint and consequent weathering action.

Further, the invention relates to a machine for removing the sealing or other materials from the joints between sections of concrete or the like, and for filling the joint with new material in cold workable condition, leaving the upper surface of the filling material relatively rounded and smooth, but sufficiently low so that when maximum contraction occurs there will be no upstanding ridge or bulge which might cause the jolting of vehicles passing thereover.

Heretofore the fillings in joints between sections of walks, roadways, airfield runways and the like have been unsatisfactory for various reasons, including failure to fully protect from the weather, deterioration from temperature changes particularly from excessive heat, and the creating a ridge or bulge in the roadway.

In the filling of joints of this character the material has been removed from the joints and the joints cleaned either by hand or with crude gouges or excavating mechanisms. This has been unsatisfactory from the viewpoint of expense, amount of time consumed, and durability and efficiency of the joint. Also, the filler has been in the nature of tar or similar substance, which first had to be heated and then applied in molten condition, thereby creating a fire hazard which sometimes

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resulted in the workmen being burned, produced obnoxious or objectional odors, and required a substantial lapse of time in order to permit the material to cool before traffic could be permitted.

It is an object of the invention to provide a relatively simple, inexpensive machine which includes a power plant, can be self-propelled or can be pulled or propelled in some other desired manner, has a container or hopper for material to be injected into a joint to be filled, as well as joint excavating, cleaning and filling mechanism easily accessible from the side of the machine and driven, along with the pump for discharging material in a cold state, from the power plant of the machine, whereby joints may be readily excavated, cleaned and filled in minimum time with material capable of withstanding temperatures of relatively high character corresponding to those produced by jet aircraft.

Another object of the invention is to provide a joint filling machine which can be readily employed for cleaning and filling joints of various sizes and configurations, and in which the elements are readily adjustable, providing greater flexibility of the machine, and all resulting in reduced cost of operation and maintenance.

A further object of the invention is to provide a machine of the character described having a pilot gouger or excavator, a rotary power-driven excavating member providing traction for the machine, a power-driven rotary cleaning brush for cleaning out the joint, and an applicator behind the brush from which cold mastic or filling material may be injected into the joint to a level slightly below the surface with the filling material smooth so that due to its spacing beneath the surface of the joint it will not produce unevenness or a ridge causing bumping by a vehicle passing thereover, as well as a power plant mounted on the body of the machine for driving the various elements.

Other objects and the nature and advantages of the invention will be apparent from the following description taken in conjunction with the accompanying drawings, wherein:

Plaintiff's Exhibit No. 1 [Specifications]

Fig. 1 is a perspective illustrating one application of the invention;
Fig. 2 a detail perspective of the applicator;
Fig. 3 a perspective of the bottom of the applicator;
Fig. 4 a transverse section through the applicator on line 4-4 of Fig. 2;

Fig. 5 a detail perspective illustrating the relation of the pilot gouger, the traction providing cutter, the cleaning brushes, and the applicator.

Fig. 6 a perspective of a slightly modified type of applicator;
Fig. 7, a perspective of a further modified form of applicator;
Fig. 8, a diagrammatic view illustrating a portion of the drive for the wheels of the machine;

Fig. 9, a fragmentary view on an enlarged scale and with parts in section for greater clarity showing the clutch for controlling the drive to the wheels of the machine;

Fig. 10, a fragmentary plan view showing the manner of mounting the wheels and the drive means therefor; and,

Fig. 11, a sectional view on the line 11-11 of Fig. 10 showing the over-running clutch provided in each wheel.

Briefly stated, the invention comprises a vehicle which may be self-propelled or provided with some other means of locomotion. Preferably it is provided with a supporting wheel at each side, and a guiding wheel at the front. A power plant such as, for example, a gasoline engine is mounted upon the forward portion of the body, and this power plant through reduction gearing serves to drive the various elements of the machine, as well as propel the machine itself.

The power plant through a dual speed transmission may be employed to drive a positive displacement pump for forcing the mastic or joint filler through a discharge tube to an applicator which may be wielded manually or disposed along the side of the machine in a definite position. The mastic may be supplied from a hopper and a tube to the

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positive displacement pump. The hopper is provided with a wall scraping agitator, also driven from the power plant.

The joint treating mechanism is disposed along the side of the machine and includes a practical, adjustable pilot gouge, a rotary excavator and traction member, and a brush ahead of the applicator. The gouger and rotary excavator are mounted on a vertically adjustable arm so that they may be disposed at the proper height.

A series of chains provide the driving force for the rotary excavator and the brush.

The machine may have handlebars or handgrips at one end of the same such as, for example, at the rear, adjacent which may be disposed controls for the power plant.

With continued reference to the drawings, the invention comprises a wheeled vehicle having a frame 10, supported for movement over a surface by means of wheels 11 disposed one on each side of the vehicle, and with a front or caster wheel 12 rotatably supported in a fork 13. The fork is revolvable in the lower end of a rod 14 vertically adjustable in ears 15 detachably fixed to the frame 10 by means of removable pins 16. These removable pins may be received in seats or sockets 14' in the rod 14.

The machine may be provided with a handle 17 attached to one of its ends as, for example, to the rear end of the frame of the vehicle as shown, and by means of which an operator may control and guide the vehicle. The machine may be provided with a power plant such as, for example, a gasoline engine 18, by means of which the elements of the machine may be driven. The power plant may include a gear-box 19 housing a two-speed drive for a shaft 20, having mounted thereon a sprocket wheel (not shown) which drives a larger sprocket 21, and by means of a chain 22 operates a gear-type or other positive displacement pump 23 for feeding the joint filling mastic material.

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Upon the shaft 20 is mounted a grooved pulley 24 which drives a second pulley 26, by means of a V-belt 25. The pulley 26 through suitable gearing connections may operate an agitator (not shown) and a substantially conical hopper 27 for maintaining the filling material in condition to be fed through a tube 28 to the pump 23.

Power is supplied to the two-speed transmission from the power plant by means of reduction gearing (not shown) and a sprocket wheel 29 mounted on the shaft 30 which drives the chain 31.

The gearbox or transmission 19 controls the gear ratio and thereby the speed of rotation of the shaft 20 under the influence of an operating lever 32 connected by a cable 33 such as a Bowden wire or the like, to a gear-shift or control lever 34 on the handle 17. This makes it possible to control the power plant by means of a cable 35 connected to control means (not shown) on the handle 17.

Projecting upwardly from the frame 10 and fixed thereto is a post or column 36 provided with openings 37 at suitably spaced intervals. The upper end of the column 36 may be maintained in position by a brace 38 connected to other portions of the frame. An L-shaped bracket 39 is provided and has an enlargement at one end with an opening 40 for receiving the column 36 and permitting vertical adjustment of the bracket relative thereto. The bracket 39 may be secured in fixed relation to the column 36 by means of a pin or set screw 41 passing through a threaded opening in the bracket and into one of the openings 37 for allowing vertical adjustment.

At the lower end of the bracket 39 a shaft 42 is rotatably maintained in a bearing extending through the bracket along the axis substantially parallel to the axis of the wheels 11 and a rotary cutter 43 having cutting teeth 44 is removably maintained on the shaft 42 for rotation therewith for performing a cutting operation and serving to drive the vehicle forward.

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The portion of the shaft 42 extending toward the frame is provided with a sprocket 45 fixed to such shaft and connected by means of chain 46 to a sprocket 57 fixed to the shaft 30. It will be evident that shaft 30 is mounted for rotation in suitable bearings 48 and 49.

An arm 50 extends forwardly from the lower end of the bracket 39, and adjustably receives a pilot gouge 50' held in place by a set screw 50''. The pilot gouge 50' serves to remove excess filling material in the joint to be excavated and filled. A second arm 51 extends rearwardly from the lower end of bracket 39 and is connected by means of a universal joint 51' to a second arm 52 connected by means of a universal joint 53 to a third arm 54 so that there may be a lateral swinging between said arms without relative rotation thereof. A suitable bearing (not shown) is located on arm 52 intermediate the ends thereof and rotatably supports a shaft 55 which carries removable brushes 56 and 57. The shaft 55 is rotated by means of a chain 58 engaging a sprocket on shaft 55 and another sprocket on shaft 42 whereby the brushes 56 and 57 are rotated in the same direction as the rotary cutter 43.

An extensible strut comprising a cylinder 59 having a pivotal connection 60 to bracket 39 and a rod 61 telescopically received in the cylinder 59 and having a pivotal connection 62 to ears mounted on arm 52 controls the relative vertical position of the brush with respect to the cutter 43. This extensible strut may include a spring for normally biasing the rod 61 toward its operative position or it may include a fluid cylinder for controlling the relative positions of the parts thereof. The pivotal connections 60 and 62 allow limited lateral movement of the arm 52 so that the brush 56 may be angularly offset with respect to the plane of the cutter 43.

A flexible tube 74 is connected at one end by means of a nipple 75 to the elbow 64 of the nozzle and the other end of the flexible tube 74 is connected to an outlet nipple 76 of a shutoff valve 77 which is in communication with the outlet of the gear pump 23. A suitable by-pass 78,

Plaintiff's Exhibit No. 1 [Specifications]

which may have a pressure relief valve therein, is arranged between the outlet and inlet of the gear pump to prevent damage in the event the shutoff valve is completely closed or some unexpected obstruction occurs.

Referring more particularly to Figs. 2 to 4 inclusive, it will be observed that the plate 66 is provided with a rib 79, (Fig. 3) extending longitudinally thereof substantially in line with the nozzle 63 which rib is adapted to extend into the groove or crack between the sections of concrete or the like. The nozzle 63 projects downwardly from the plate 66 approximately the depth of the crack to be filled and its lowermost portion is open and an elongated notch or opening 80 is provided on the rear side of the nozzle, being open at the lower end and extending upwardly to adjacent the plate 66. At the forward side of the nozzle another opening or notch 81, of materially less height than notch 80, is provided to permit observation of the nozzle during the time that filling material is discharged therefrom as well as to permit discharge of filling material. In operation of the nozzle it will be evident that the filling material is forced thereto by means of the pump 23 and the amount of filling material discharged is accurately controlled by the speed of operation of the pump, the rate of movement of the machine along the ground, the shape of the nozzle and the controlling effect of the rib 79 and plate 66 whereby the groove or crack may be accurately filled to the desired height, the bypass 78 prevents excessive discharge from the nozzle.

The nozzle 82 shown in Figure 3 is somewhat more elongated in the direction of movement to allow a greater amount of controlled confinement of the filling material so that such material may exude or be discharged from a substantially greater area.

In figure 2 a wand 83 of a hollow relatively rigid tube is connected to nipple 75 to permit manual operation of the nozzle 63 and the plate 66. The supply hose 74 may be high pressure and flexible for permitting the manual operation of the nozzle 63 and plate 66 by means of the hollow

wand or handle 83 whereby joints which have been excavated may be filled.

In Fig. 6 a further modification of an applicator nozzle and a controlling rib are shown and may comprise a triangular nozzle tip 84 which may be formed by cutting a tube at an angle to the axis thereof and using a continuation of such tube to provide an elbow 85 having a connection 86 for joining the nozzle to a source of filling material under pressure. Plate 87 may be of generally convex contour on its underside for projecting into a joint or groove for preventing the filling material from overfilling the groove and for maintaining the desired contour of the upper surface on the filling material in the groove.

The modification shown in Fig. 7 includes a nozzle 88 projecting downwardly from a concave-convex plate 89 and with an elbow 90 projecting upwardly for providing a connection by means of threads 75 to a flexible tube or a tubular wand as above described. The construction of Fig. 7 is particularly useful where joints of varying sizes are to be filled since the generally continuous convex surface 91 of the plate 89 may engage the edges of the groove or joint regardless of the width thereof and the filling material will be depressed below the surface of the concrete slab or other structure.

Referring particularly to Fig. 5, the cutter 43 is shown in the operation of removing the objectionable groove filling material which extends substantially above the adjacent concrete slab 92 and such cutter is rotated in the direction shown by the arrows in Fig. 1 and 5 to provide an automatic feed for the entire machine while removing the old filling material from the groove or while increasing the size of existing grooves or making new grooves. The brush 56 extends into the groove 93 while the brush 57 engages the surface of the slabs 92 for removing any surface obstructions therefrom so that the plate 66 may be maintained in intermittent contact with such slabs and the rib 79 may project into the groove.

Plaintiff's Exhibit No. 1 [Specifications]

The cutter 43, brush 56 and plate 66 are maintained in the groove even though the groove be of irregular shape. The universal connections at 51 and 53 permit such adjustments to occur automatically. Further, the nozzle 63 projects into the groove and the joint filling material is discharged therefrom through the bottom end as well as through the opening or notch 80 while the rib 79 prevents the filling material from projecting above the surface of the filling material as shown at 94 in Fig. 5.

There is provided a new and useful machine for filling joints or grooves in new construction as well as replacing objectionable joint filling material which extends above the surface of the adjacent slabs in existing structures. The machine may be used for forming additional expansion joints in existing construction to prevent buckling and the amount of expansion space necessary between adjacent slabs may be predetermined and different sizes of cutters may be used as required. The completed joint avoids the objectionable bump which may be observed on most roadways where heated filling materials are poured into the joint with large portions thereof on the upper surface. The present invention overcomes these objections and provides a satisfactory solution to a long existing problem.

In airplane runways particularly, the high temperature from the jet type power plants produces such excessive heat that the existing types of joint filling material does not resist such heat and remain in place.

Since it is highly desirable that means be provided for positively driving the ground engaging wheels 11 to propel the apparatus over the ground, the wheels 11, as best shown in Fig. 10, are rotatably mounted on an axle 95 which in turn is supported by tubular shafts 96 and 97 which may be secured to the chassis 10 of the apparatus by U-bolts or other suitable fastening means 98.

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As best shown in Figs. 10 and 11, the ground engaging wheels 11 are each provided with a hub 99 having a plurality of internal ratchet teeth 100, each tooth presenting an abutment 101 which abutments are connected by cam surfaces 102. As stated above, the wheels 11 are freely rotatable on the axle 95, and in order to transmit driving power from such axle to the wheel, there is provided in each end of the axle 95 a slidable pawl 103, the ends of which are beveled in opposite directions as shown at 104, pawl 103 and teeth 100 constituting an over-running clutch.

Mounted upon the axle 95 for driving the same is a pulley 105 engaging a V-belt 106 which in turn engages a pulley 107 mounted upon the power shaft 20 extending from the transmission 19.

The pulley 107 constitutes a clutch for selectively transmitting power to the wheels 11, and pulley 107 comprises a portion 108 fixed to the shaft 20, and a complementary portion 109 slidably mounted on the shaft 20 for movement toward and from the portion 108. Portions 108 and 109 are provided with complementary tapered surfaces 110 and 111 which serve to engage the belt 106 to drive the same, this driving engagement being accomplished by movement of the portion 109 toward the portion 110.

In order to move portion 109 toward and away from portion 110 there is provided a bell crank lever 112 pivotally mounted at 113 on the chassis 10, one arm 114 of the bell crank lever 112 being provided with a yoke 115, the arms of which engage in a groove 116 in the portion 109 of pulley 107. The other arm 117 of bell crank lever 112 connects to a control cable 118 which is enclosed in a housing 119 leading to a control handle 120 mounted on the handle bar 17 in a position convenient to the operator. Actuation of the control handle 120 will serve to move the portion 109 of pulley 107 toward or from the portion 108 to engage or disengage the belt 106, thereby controlling the transmission of power from the motor 18 to the wheels 11.

Plaintiff's Exhibit No. 1 [Specifications]

As is well known when a vehicle turns a corner, the outer wheel must travel at a higher rate of speed than the inner wheel, and the pawl and ratchet mechanism above described in connection with Figs. 10 and 11 serves to compensate for this movement of the outer wheel in that engagement of the pawl 103 with one of the abutments 101 of teeth 100 on the inner wheel will continue to drive this wheel and the action of the operator in turning the apparatus will cause the outer wheel to move at a faster rate and thus cause the beveled surface 104 of the pawl 103 to engage one of the cam surfaces 102 thereby sliding the pawl 103 through shaft 95 into the space provided by an opposite tooth 100. This constitutes an over-running clutch action and as long as the speed of rotation of one wheel exceeds the speed of rotation of axle 95 the over-running action will continue, but upon movement of the apparatus in a straight line, both of the pawls 103 will engage an abutment 101 and both wheels 11 will serve to drive the apparatus over the ground.

The above described mechanism represents a relatively simple and inexpensive drive for an apparatus of this type and permits complete control thereof by the operator to start or stop movement of the apparatus over the ground and also permits turning thereof in any desired path of movement.

It will be obvious to those skilled in the art that various changes may be made in the invention, without departing from the spirit and scope thereof, and therefore the invention is not limited by that which is shown in the drawings and described in the specification, but only as indicated in the appended claims.

COPY OF THE CLAIMS IN SUIT
1, 4, 5, 10, 14, 15, 16 AND 18Plaintiff's Ex. 1
(Cont'd.)

1. A machine for cleaning and filling joints comprising a frame, ground-engaging supporting wheels for movably supporting said frame on a surface, power means on said frame, a vertically adjustable bracket projecting from said frame and having a substantially horizontal bearing, a shaft rotatably mounted in said bearing, a cutter mounted on said shaft, a vertically adjustable pilot gauge mounted on said bracket, arm means projecting rearwardly from said bracket, a nozzle pivotally connected to the rear end of said arm means and projecting downwardly therefrom, a ground-engaging plate extending rearwardly from said nozzle and having a downwardly projecting rib in alignment with said nozzle on the lower side of said plate, a rotatable brush mounted in a bearing of said arm means, means connecting said cutter and said brush to said power source for operating the cutter and brush in a direction to feed the machine forwardly, and means for supplying joint filling material under pressure to said nozzle whereby the machine will excavate the joint to uniform dimensions and fill the same in a manner that substantially all of the filling material will be below the upper portion of the joint.

4. A machine for cleaning and filling joints comprising a frame, ground-engaging supporting wheels for movably supporting said frame on a surface, power means on said frame, a vertically adjustable bracket projecting from said frame and having a substantially horizontal bearing, a shaft rotatably mounted in said bearing, a cutter mounted on said shaft, arm means projecting rearwardly from said bracket, a nozzle pivotally connected to the rear end of said arm means and projecting downwardly therefrom, a ground-engaging plate extending rearwardly from said nozzle and having a downwardly projecting rib in alignment with said nozzle on the lower side of said plate, a rotatable brush mounted in a bearing of said arm means, means connecting said cutter and said brush to said power source for operating the cutter and brush in a direction to feed the machine forwardly, and means for supplying joint filling material under pressure

* Note: Claims 1, 4, 5 and 10 were allowed by the Board of Appeals. They are reproduced only to facilitate comparison with the refused claims 14, 15, 16 and 18.

to said nozzle whereby the machine will excavate the joint to uniform dimensions and fill the same in a manner that substantially all of the filling material will be below the upper portion of the joint.

5. An attachment for a wheeled vehicle comprising a first bracket for adjustable connection to the vehicle and having a bearing at its free end extending transversely to the direction of movement of the vehicle, a rotatable cutter mounted in said bearing for engagement with a supporting surface for excavating a groove therein, an arm extending rearwardly from said bracket and having a bearing thereon, a rotating brush mounted in said bearing of said arm, a nozzle connected to said arm and having a discharge portion opening downwardly and rearwardly and closed at the front and sides, said nozzle projecting downwardly for penetration into an excavated and cleaned groove for filling the same, means connecting said brush and cutter to a source of power on said vehicle, and means for supplying filling material from said vehicle to said nozzle.

10. Means for filling a joint comprising a plate having a rib projecting from one side thereof, a nozzle projecting from the same side of the plate and in substantial alignment with said rib, said nozzle having a discharge portion opening downwardly and rearwardly in the direction of said rib and closed at the front and sides, the said nozzle being of a width to extend into a joint to be filled and accommodating the plastic material under pressure whereby the said nozzle and plate may be moved together for filling a joint and said rib serving to limit the height of the filling material in the joint.

14. Apparatus for forcibly filling joints in pavement with a highly viscous filler, said apparatus comprising a tube having one end terminating in spaced side walls with exterior side surfaces spaced apart less than the spacing of the walls of the joint between which the device is to be inserted for filling, and with the internal surfaces of such walls providing at the end of the tube an elongated depending discharge passage opening downwardly and rearwardly and closed at the front and sides thereof, whereby the highly viscous filler can be forcibly discharged from said passage downwardly into the joint to be filled and upon the filling of the

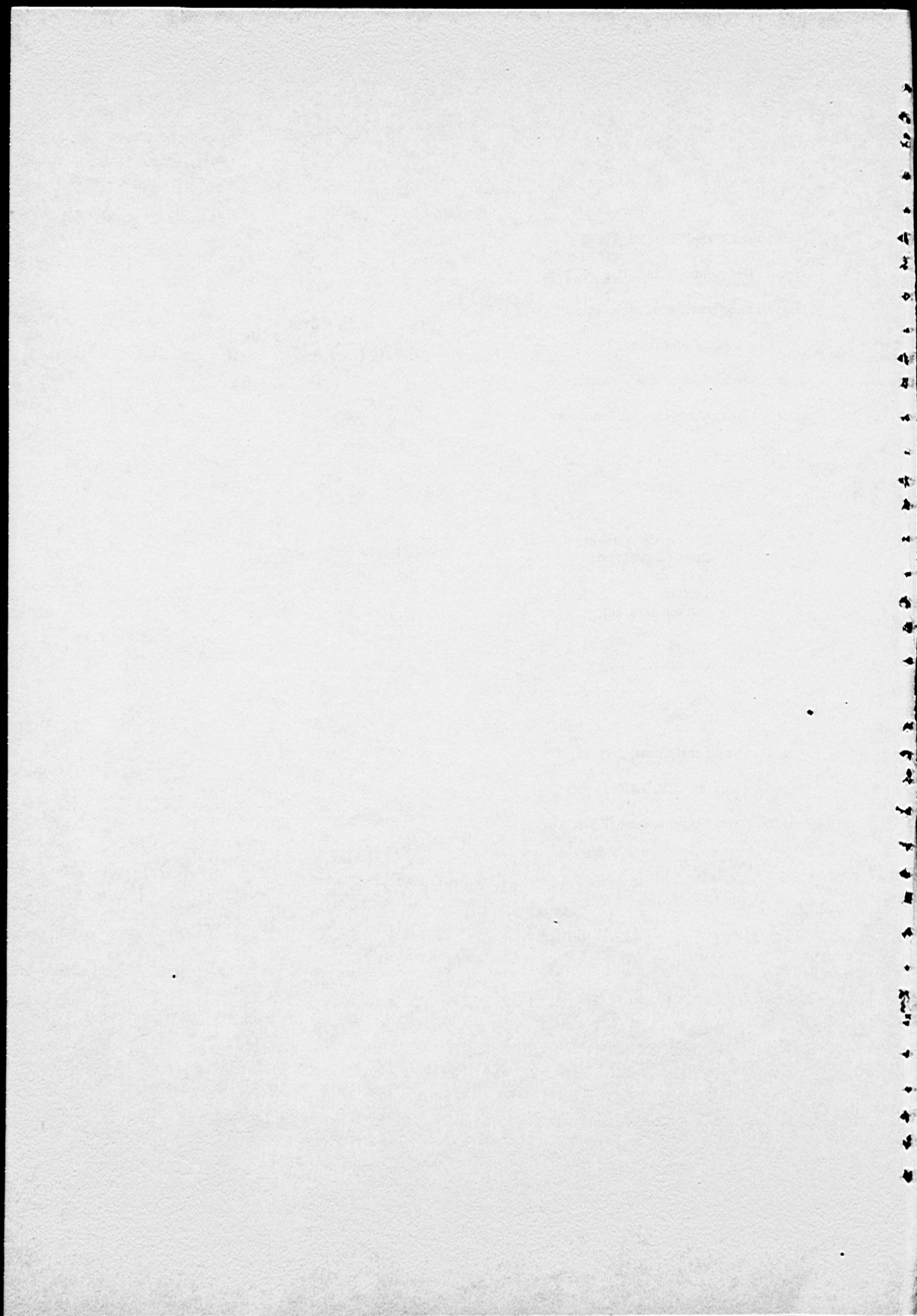
joint at the point of such downward discharge, force exerted upon the filler will be transmitted to the closed front portion of the discharge end of the tube and facilitate forward motion of the apparatus during the filling of a joint.

15. The structure of Claim 14 in which the apparatus has a lateral flange for engaging the upper surface of the pavement at the sides of the joint.

16. The structure of Claim 14 having a surface extending from the tube at the rear of the discharge passage and a downwardly projecting surface portion.

18. Apparatus for cleaning and filling joints comprising a vehicle, joint cleaning means carried by said vehicle, an applicator for supplying highly viscous filler downwardly under high pressure directly into a joint to be filled, and power means for discharging highly viscous filler with great force from said applicator into and along said joint and a depending discharge portion for location in the cleaned joint for filling the same, said depending portion of the applicator having a pair of side walls and a connecting front wall with the rear end of the applicator open and whereby upon extrusion by the application of force the filler will be discharged directly downward into the joint and the exerted force will be transmitted to the front wall of the applicator and facilitate forward motion of the apparatus as the joint is filled.





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DEPARTMENT OF COMMERCE
United States Patent Office
Washington

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Paper No. 7

A. Yates Dowell & A.
Yates Dowell, Jr.
1158 Munsey Building
Washington 4, D. C.Applicant: Charles P. Gross
Ser. No.: 326,471
Filed: December 17, 1952
For: Joint Filling Machine
[Mailed Oct. 31, 1955]
Pat. Div. 33Please find below a communication
from the EXAMINER in charge of
this application.[Stamp] Robert C. Watson,
Commissioner of Patents.

Responsive to amendment filed October 3, 1955.

The drawings should be corrected.

Claims 1, 3, 5, and 10 are the only remaining claims in this
case.

* * * * *

An issue has been reached. This rejection is now made FINAL.

JLNackenoff:ljb

Examiner

PLAINTIFF'S EXHIBIT # 2

Fig. 1

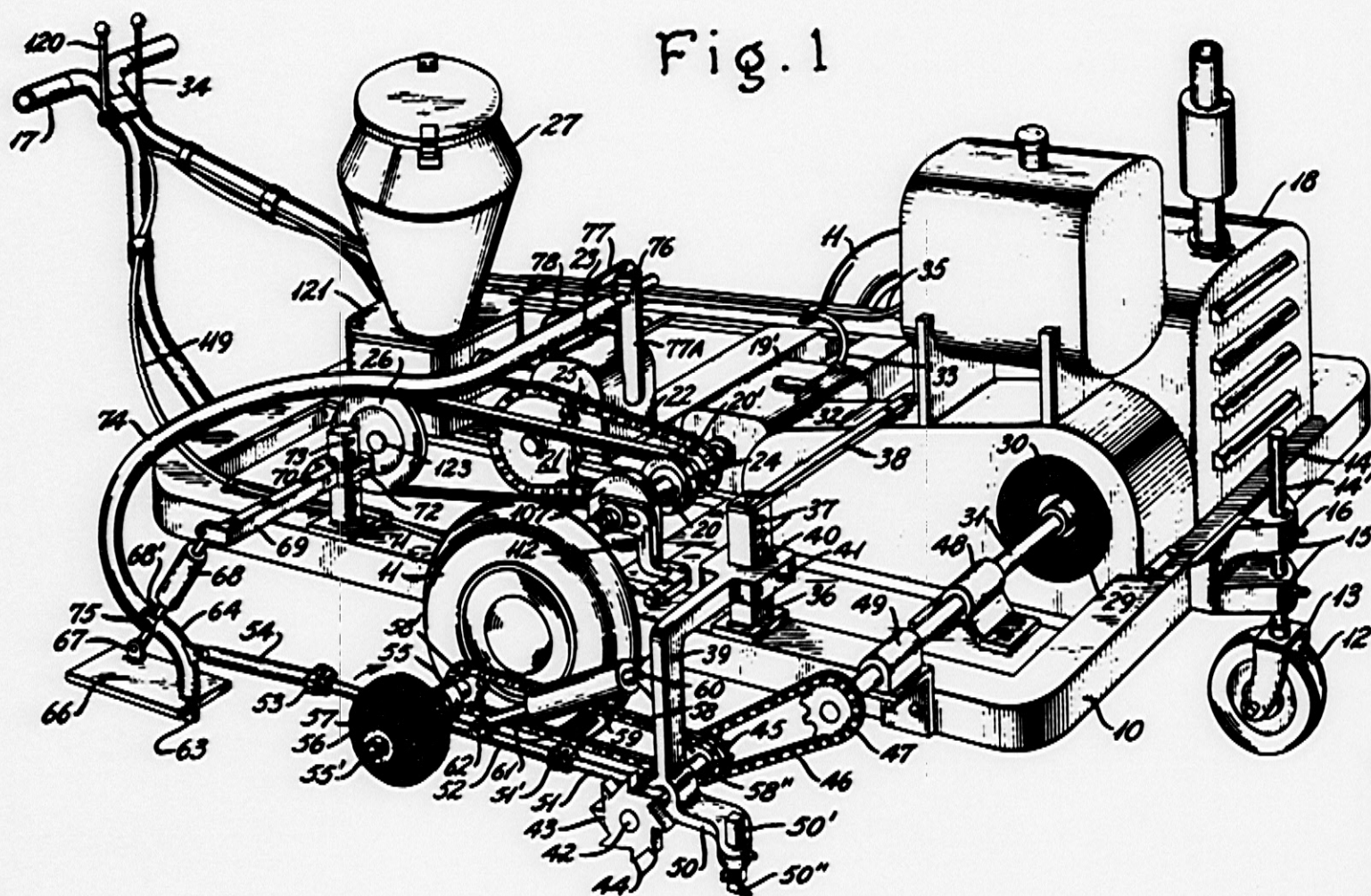


Fig. 2

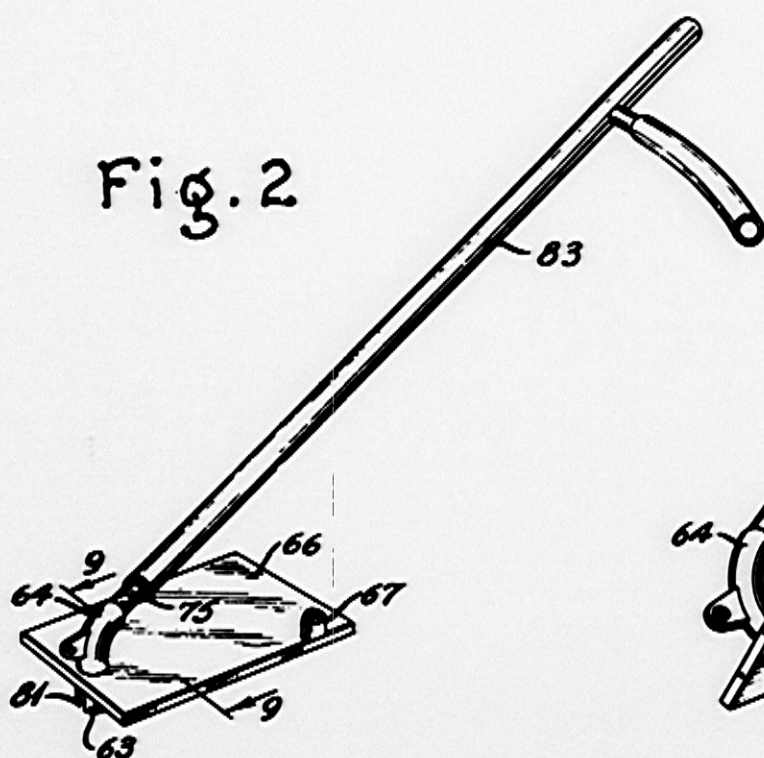
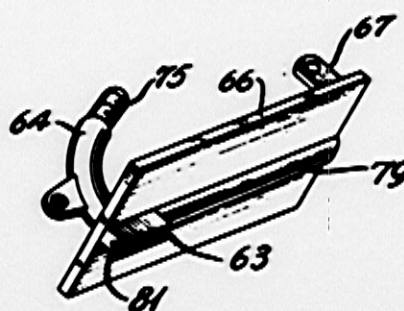
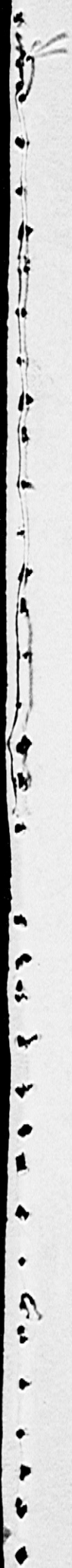


Fig. 3





Feb. 13, 1934.

J. N. HELTZEL

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MACHINE FOR AND METHOD OF PRODUCING JOINTS OR TRAFFIC LINES IN CONCRETE

Original Filed April 21, 1925 8 Sheets-Sheet 1

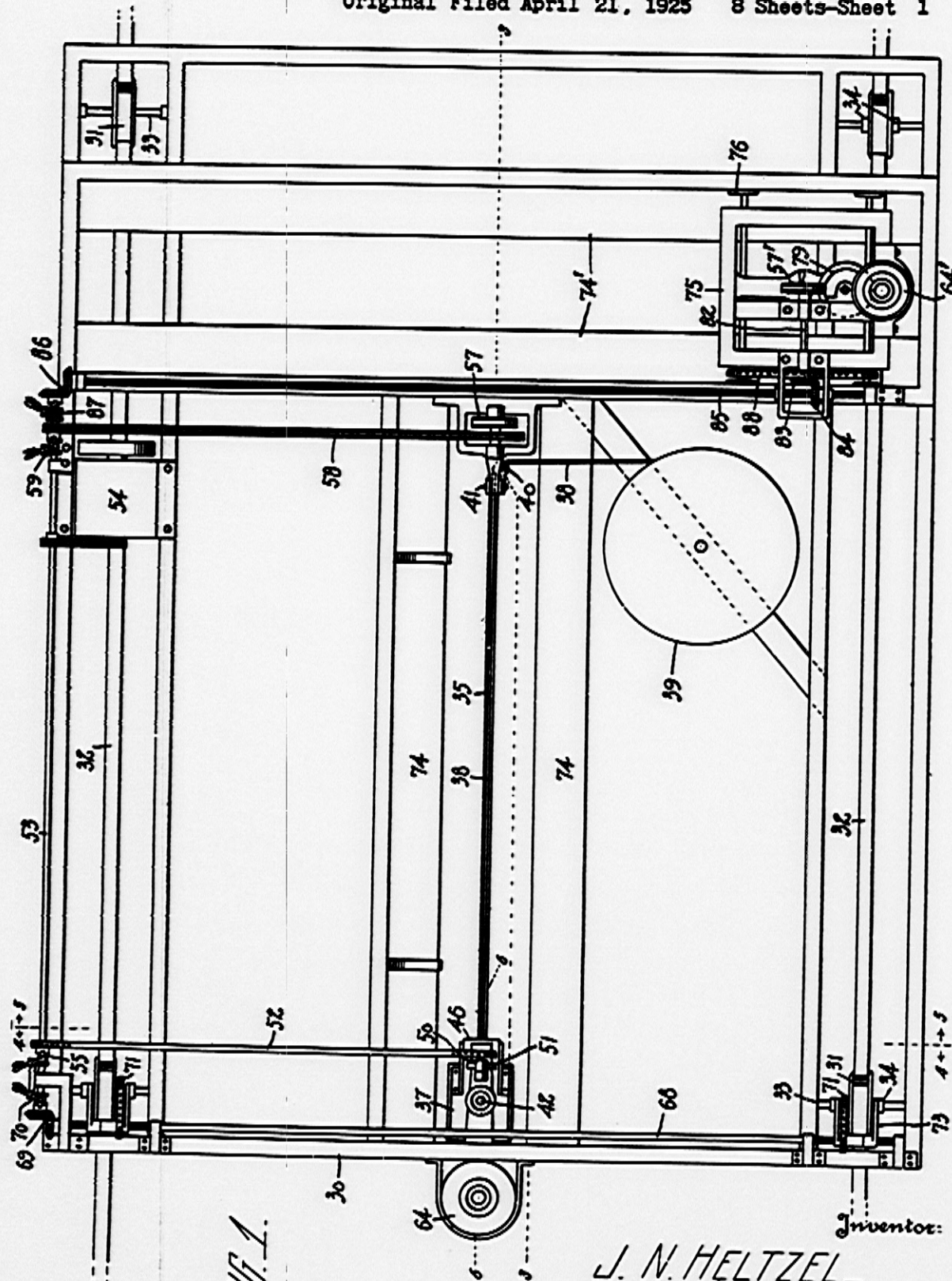


FIG. 1.

J. N. HELTZEL

By *Monroe C. Miller*
Attorney-

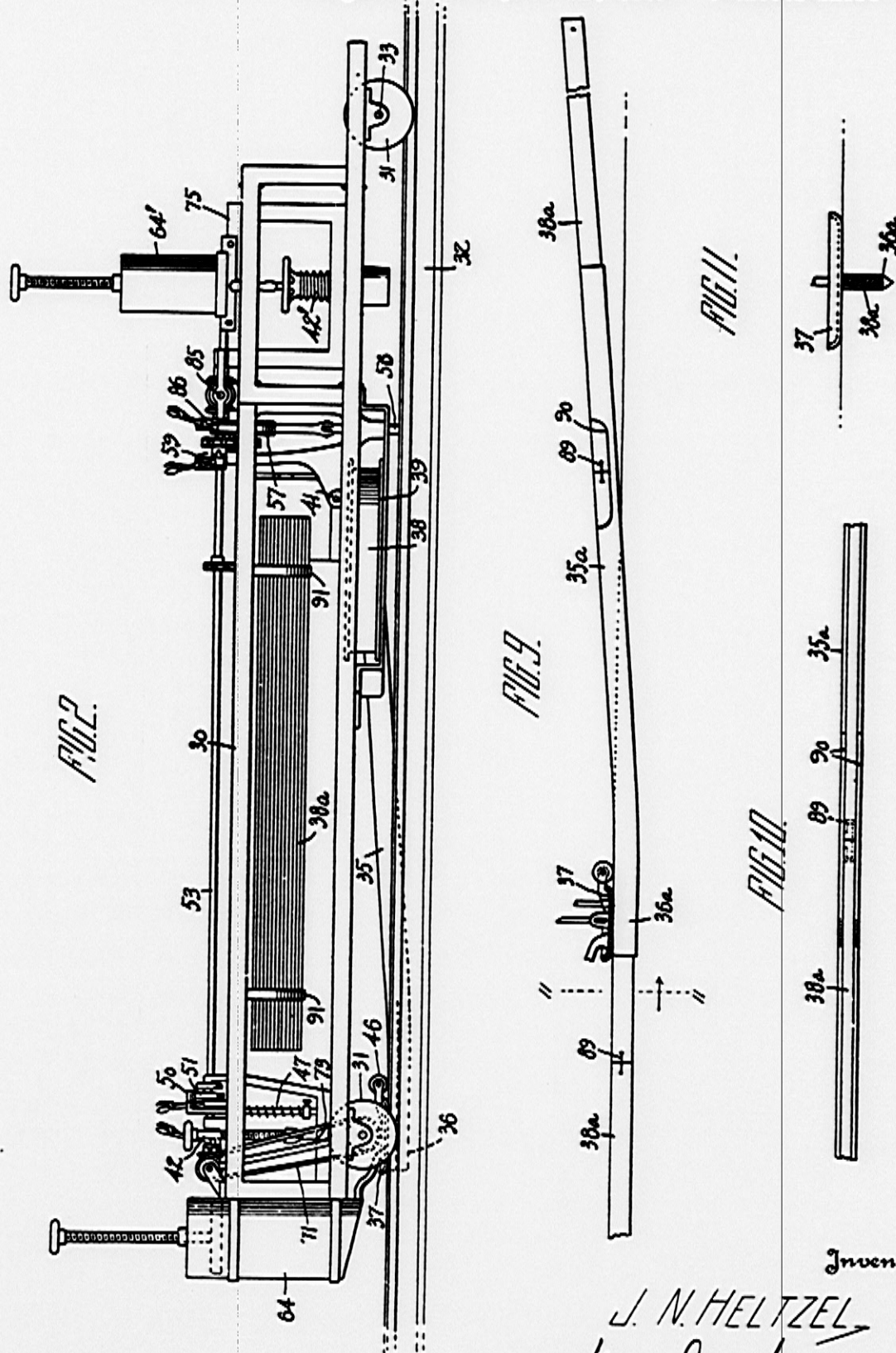
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J. N. HELTZEL

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MACHINE FOR AND METHOD OF PRODUCING JOINTS OR TRAFFIC LINES IN CONCRETE

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Inventor:

J. N. HELTZEL

By *Monroe E. Miller*

Attorney-

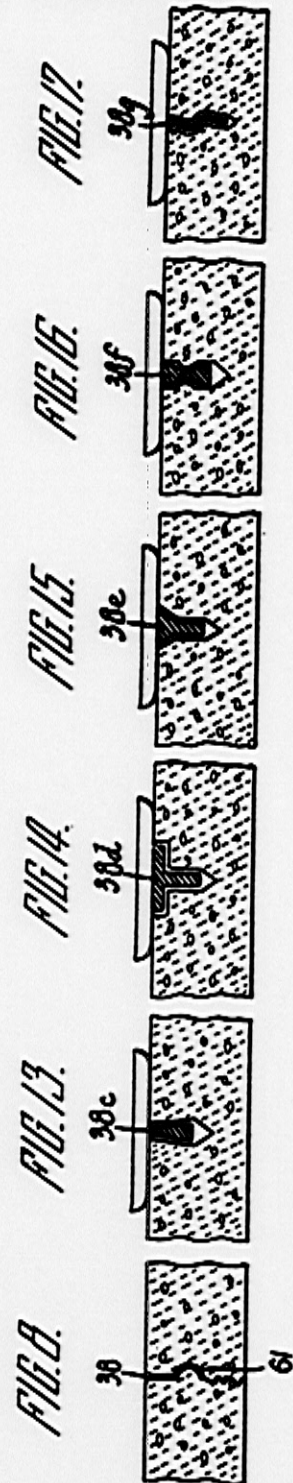
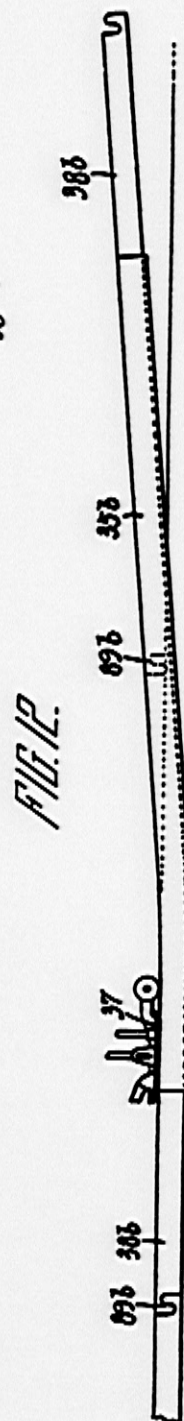
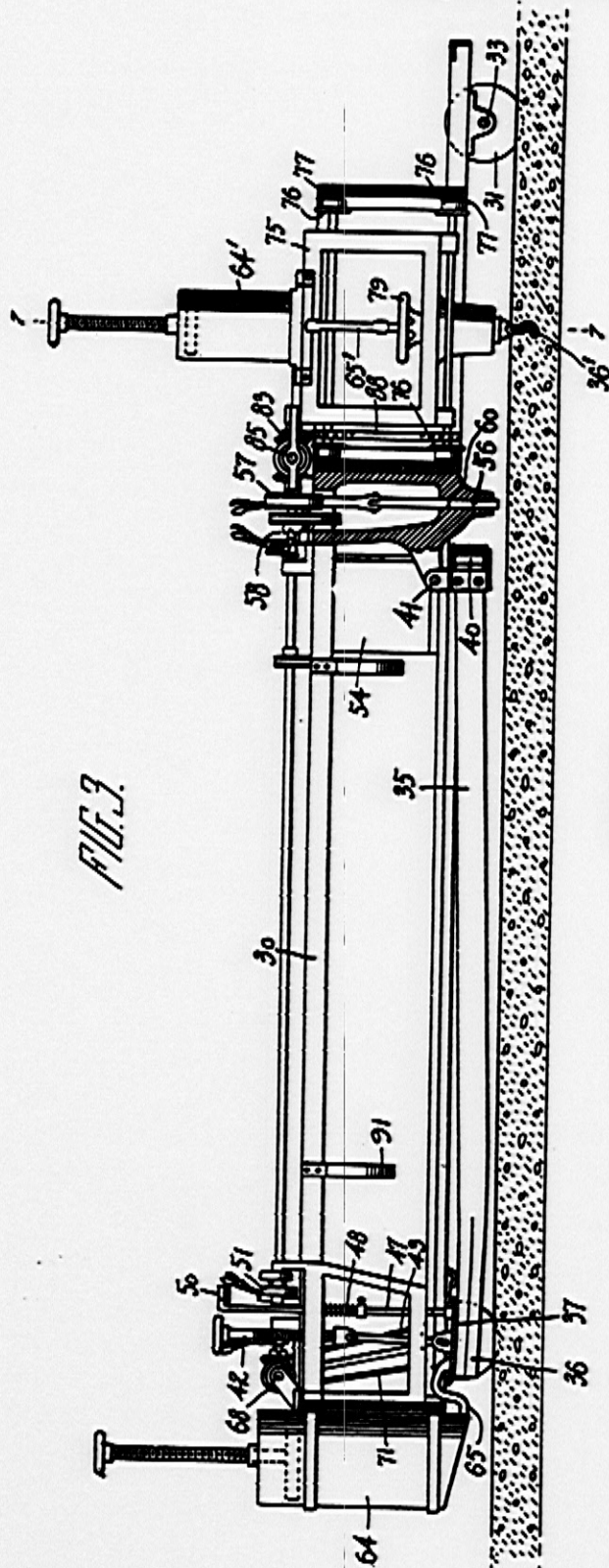
Feb. 13, 1934.

J. N. HELTZEL

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MACHINE FOR AND METHOD OF PRODUCING JOINTS OR TRAFFIC LINES IN CONCRETE

Original Filed April 21, 1925 8 Sheets-Sheet 3



Inventor:

J. N. HELTZEL

384 *Howe & Miller*
Attorney-

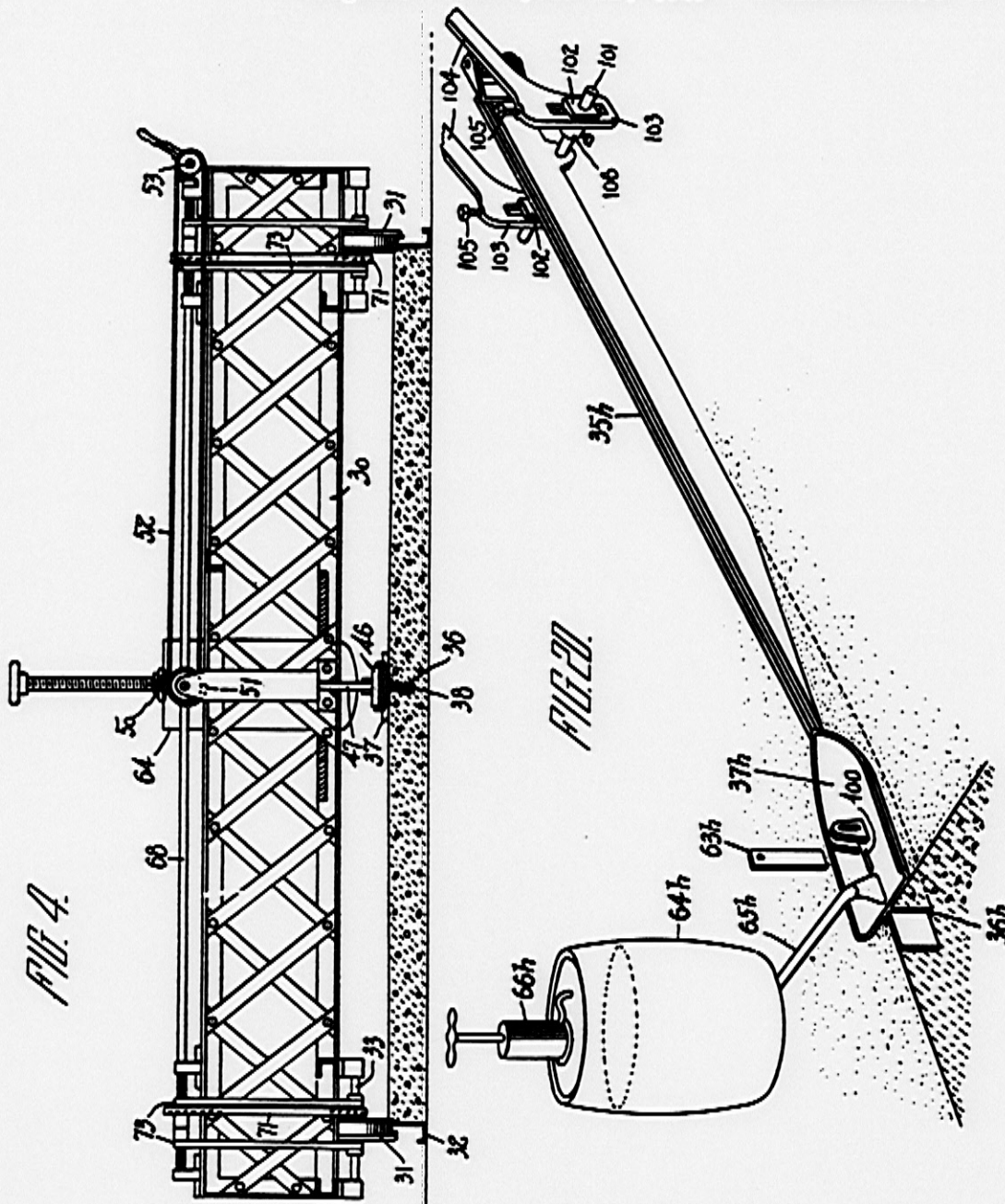
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J. N. HELTZEL

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MACHINE FOR AND METHOD OF PRODUCING JOINTS OR TRAFFIC LINES IN CONCRETE

Original Filed April 21, 1925 8 Sheets-Sheet 4



Inventor.

J. N. HELTZEL

By *Howard E. Miller*

Attorney.

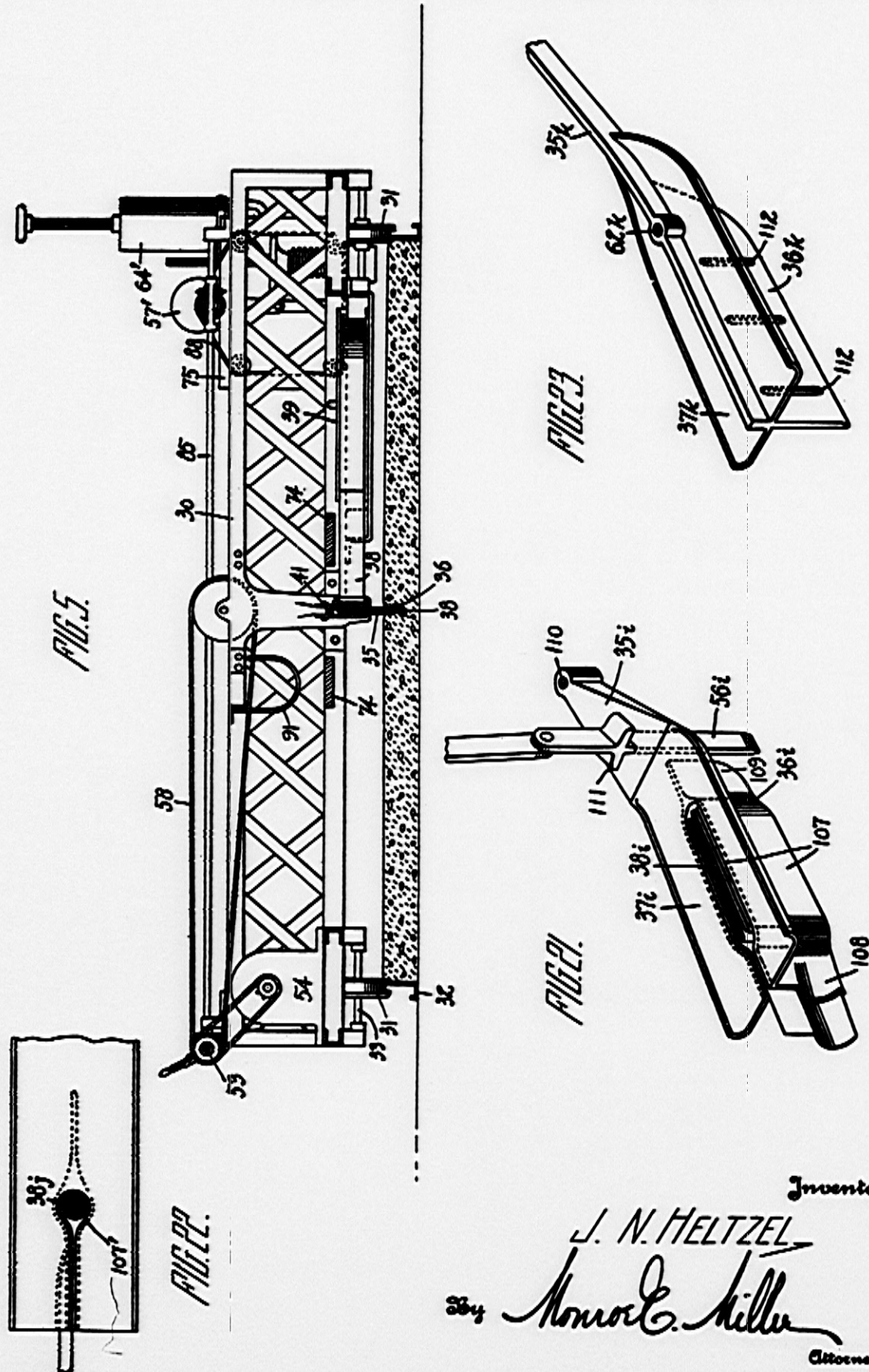
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J. N. HELTZEL

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MACHINE FOR AND METHOD OF PRODUCING JOINTS OR TRAFFIC LINES IN CONCRETE

Original Filed April 21, 1925 8 Sheets-Sheet 5



Inventor:

J. N. HELTZEL

384 *Monroe E. Miller*

Attorney-

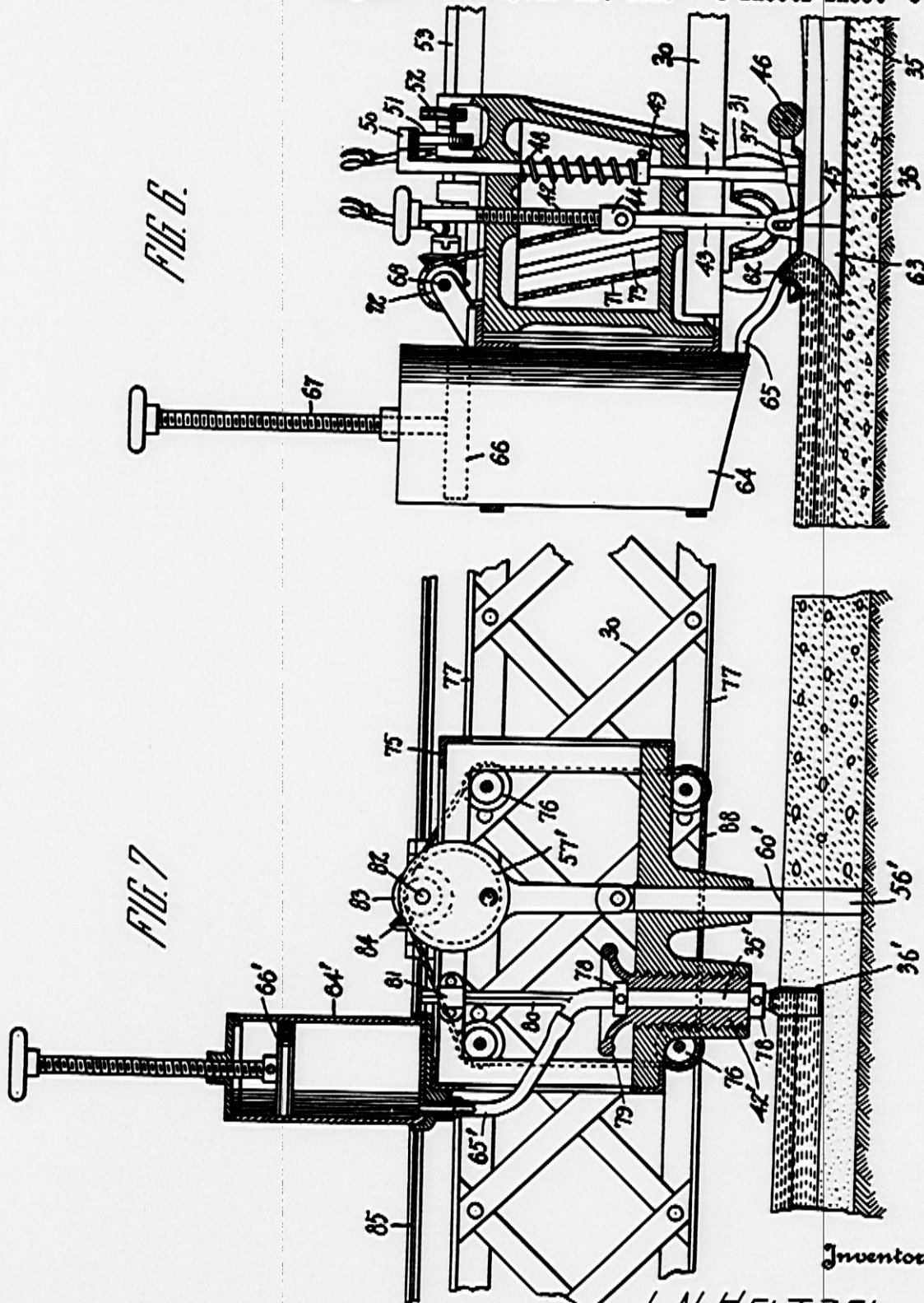
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J. N. HELTZEL

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MACHINE FOR AND METHOD OF PRODUCING JOINTS OR TRAFFIC LINES IN CONCRETE

Original Filed April 21, 1925 8 Sheets-Sheet 6



Inventor:

J. N. HELTZEL

384 Howard E. Miller

Attorney-

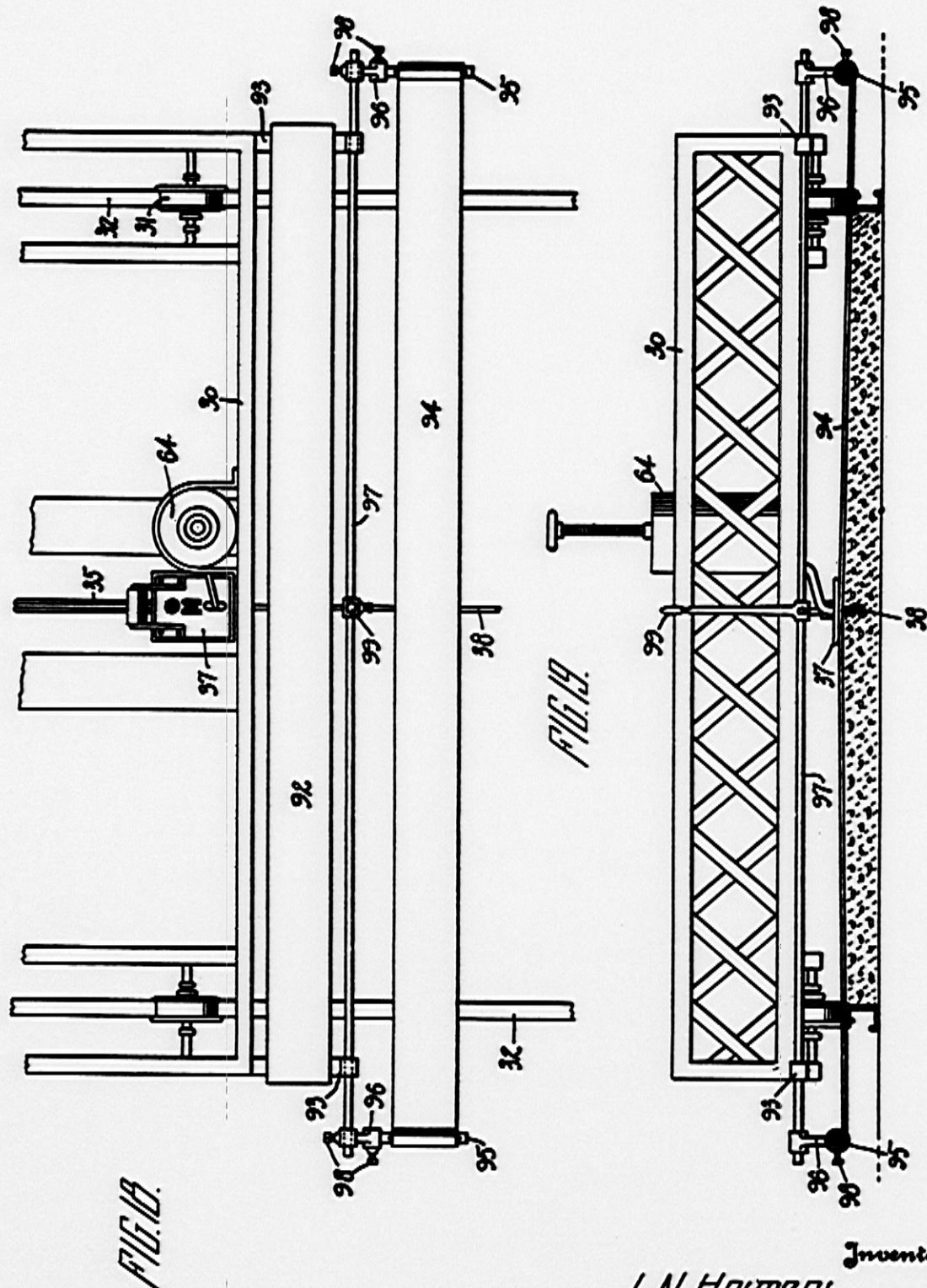
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J. N. HELTZEL

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MACHINE FOR AND METHOD OF PRODUCING JOINTS OR TRAFFIC LINES IN CONCRETE

Original Filed April 21, 1925 8 Sheets-Sheet 7



Inventor:
J. N. HELTZEL
By *Monroe C. Miller*
Attorney-

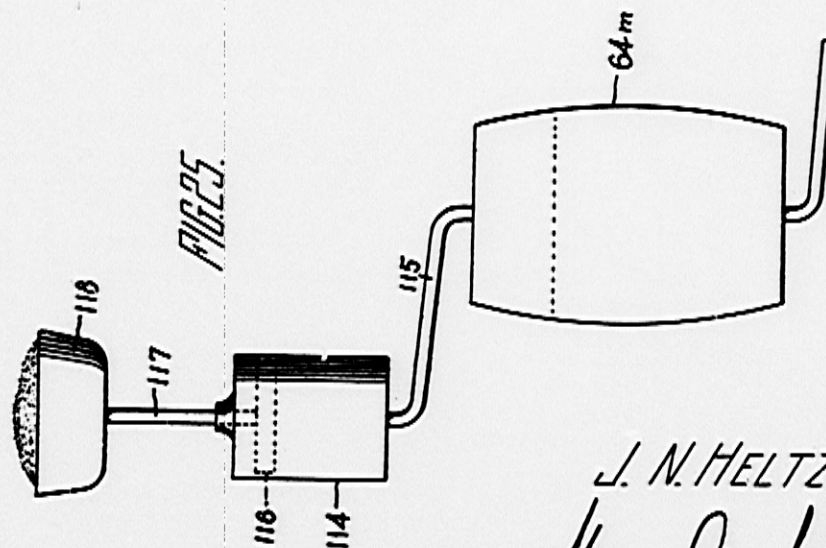
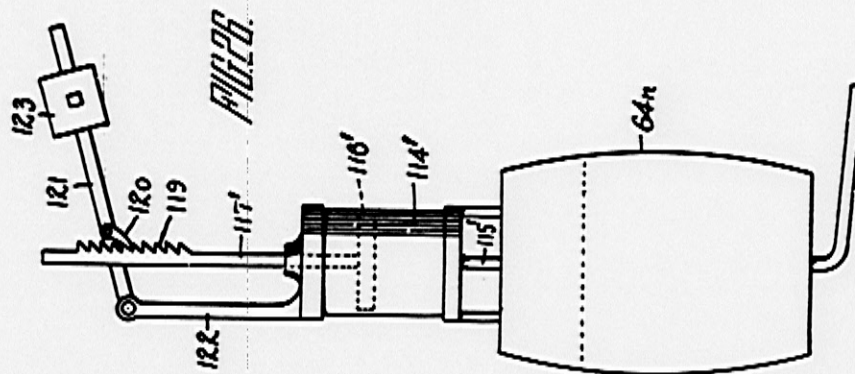
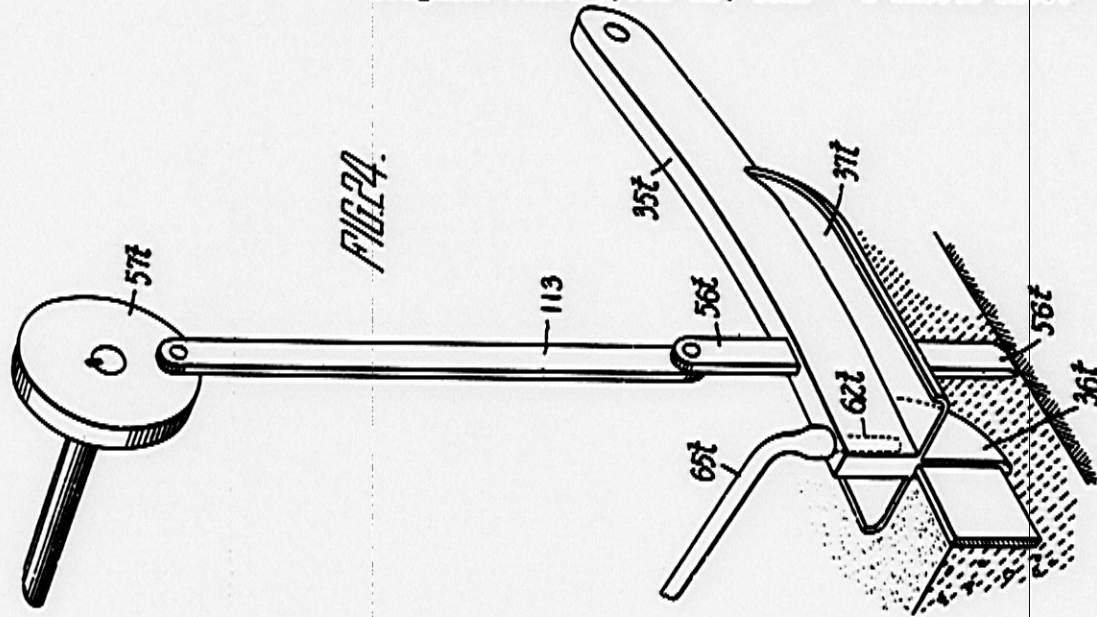
Feb. 13, 1934.

J. N. HELTZEL

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MACHINE FOR AND METHOD OF PRODUCING JOINTS OR TRAFFIC LINES IN CONCRETE

Original Filed April 21, 1925 8 Sheets-Sheet 8



Inventor.

J. N. HELTZEL

384 *Monroe E. Miller*
Attorney.

UNITED STATES PATENT OFFICE

1,946,972

MACHINE FOR AND METHOD OF PRODUCING JOINTS OR TRAFFIC LINES IN CONCRETE

John N. Heltzel, Warren, Ohio

Application April 21, 1925, Serial No. 24,801

Renewed May 28, 1930

53 Claims. (Cl. 94--45)

The present invention relates to the production of joints and traffic lines in concrete roads and similar surfacing structures, and aims to provide a novel and improved method of and means for producing or installing in the road or structure, after the concrete has been poured and while it is still plastic, a joint or traffic line, or a combined joint and traffic line.

Another object is the provision of such means which is operable by a movement in the plastic concrete to provide for a rapid cutting of the plastic concrete, separating the stone or other coarse aggregate along the line of a joint or traffic line to facilitate the installing of joint material.

A further object is the provision of means of the kind indicated which will enable joints of various cross-sections to be produced or installed, according to different requirements, and which may also be used for joint material that is pre-molded, solid, plastic or semi-liquid or removable steel joint plates.

A still further object is the provision of joint installing or producing means including a tool or plate movable in the plastic concrete to separate the stones along the line of joint, creating a longitudinal vein of mortar to receive joint material therein and means for surfacing or smoothing the plastic concrete over the cut or surfacing or smoothing over joint material after it has been deposited in the vein of mortar.

It is to be understood that the various depositors and blades hereinafter described may be used for producing joints without depositing joint material or strips, also that the various blades or depositors may be drawn through the plastic concrete one or more times with the transverse surfacer surfacing over the line of the joint progressively as the machine moves forward to produce a cleft or separation in the material, after which a joint strip may or may not be installed.

A steel strip or layer of premolded, solid, plastic or semi-liquid material, of any suitable cross-section, is discharged into the joint in order to divide the road and cause the same to break or crack along the line of the material deposited in the concrete, when the breaking or fracturing occurs after the concrete has hardened.

It is also an object of the invention to provide a joint or traffic line which is accurate, and which will eliminate the irregular breaking or cracking of the concrete, such as due to the natural fracturing of the concrete, or by the use of division plates or strips placed on the sub-base for that purpose and over which the concrete is

poured. Such division plates or strips are costly to install and are practically impossible to maintain in proper line, so that the breaks are irregular and unsightly, as well as being conducive to the chipping off of the concrete along the cracks. With the present invention the break extends along a regular and accurate line, so as to divide the road neatly into slabs and provide for other advantages.

The present improvements may be used for both longitudinal and transverse joints in the road.

Still another object is the provision of a novel and improved machine embodying the improvements and having novel provisions to facilitate the installing or producing of the joint or traffic line.

With the foregoing and other objects in view, which will be apparent as the description proceeds, the invention resides in the construction and arrangement of parts as hereinafter described and claimed, it being understood that changes can be made within the scope of what is claimed, without departing from the spirit of the invention.

The invention is illustrated in the accompanying drawings, wherein—

Figure 1 is a plan view of a machine embodying the invention.

Fig. 2 is a side elevation of the machine showing the longitudinal joint device in operative position and the transverse joint means in inoperative position.

Fig. 3 is a longitudinal section on the line 3—3 of Fig. 1 showing the longitudinal joint means in inoperative position and the transverse joint means in operative position.

Figs. 4 and 5 are cross sections on the respective lines 4—4 and 5—5 of Fig. 1.

Fig. 6 is an enlarged vertical section on the line 6—6 of Fig. 1 showing the use of plastic or semi-liquid material for the longitudinal joint.

Fig. 7 is an enlarged vertical section on the line 7—7 of Fig. 3.

Fig. 8 is a cross section of the joint produced by either the longitudinal or transverse joint means.

Fig. 9 is a side elevation of a modified form of chute to accommodate premolded strips which are coupled together to be deposited in the concrete.

Fig. 10 is an enlarged fragmentary plan view of said chute.

Fig. 11 is an enlarged cross section on the line 11—11 of Fig. 9.

Fig. 12 is a side elevation corresponding to

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Fig. 9 showing the use of steel strips having their ends formed to interlock for the purpose of trailing a train of these strips longitudinally of themselves through the plastic concrete and so arranged to disconnect the strips for removal from the plastic concrete.

Figs. 13 to 17, inclusive, are cross sections showing different forms of joints that may be produced.

Fig. 18 is a plan view of the rear end of the machine, with modifications, and showing the use of a finishing float to reciprocate transversely over the cleft or joint material to smooth the concrete.

Fig. 19 is a rear end view of the structure shown in Fig. 18.

Fig. 20 is a perspective view illustrating an adjustable mounting for the chute and means for supplying plastic or semi-liquid material under pressure.

Fig. 21 is a perspective view of a modified form of device for holding a strip and discharging it into the concrete.

Fig. 22 is a fragmentary plan view showing a modification of the device illustrated in Fig. 21.

Fig. 23 is a perspective view of a modified form of depositor for discharging plastic or semi-liquid material at opposite sides.

Fig. 24 is a perspective view illustrating a further modification.

Figs. 25 and 26 are side elevations of devices for supplying plastic or semi-liquid material under pressure to the depositor.

The machine hereinafter described operates on a roadway rearwardly of the hand screeding operation or rearwardly of the mechanically screeding machine, both of which are well known in the art. The mechanical screeding machine, however, is very generally used, and as explained, this machine follows in close proximity rearwardly of the screeding operations to cleave the concrete longitudinally in the center of the road prior to the installation of joint material in the cleavage. The transverse surfer is mechanically operated to reciprocate transversely over the surface of the roadway, which eliminates the hand method and improves the quality of the work. A transverse joint cutting and installing apparatus operates in combination with a longitudinal joint cutting and installing apparatus, both of which operate in combination with the smoothing or floating device carried and actuated by the machine as hereinafter will be fully described.

The machine comprises a carriage or bridge to travel over the concrete, and said carriage is composed of a suitable frame 30 to span or bridge the road and mounted on wheels 31 that travel on the side forms or rails 32 which define the side edges of the road, the concrete being poured between said rails as described. The wheels 31 are mounted on short transverse axles 33 secured to the frame 30 and extending transversely above the rails 32, thereby permitting the wheels to be adjusted transversely to accommodate the machine for roads of different widths. The wheels at one side may be fixed on the axles against transverse adjustment by means of collars 34, while the wheels at the other side are slidable transversely to accommodate variations in the spacing of the rails, such as when negotiating curves in the road where the road is usually made wider. The wheels have double flanges to overlap the inner and outer sides of the rails so as to prevent the wheels moving transversely off the rails. The inside plate flanges of the wheels may project a convenient distance into the plastic concrete to operate along the inside

face of side forms to spade or edge the concrete along the side forms.

The longitudinal joint means or device is located intermediate the opposite sides of the frame 30 and comprises a chute or blade 35 which slopes rearwardly to permit the finishing of the surface of the concrete under the forward portion of the joint means, as well as along the sides of the joint means when in operative position, with the forward end thereof spaced above the concrete, and its rear end portion working within the concrete and terminating in a depositor 36. A float or trowel 37 is secured on the depositor 36 to slide over the surface of the concrete at the opposite sides of the depositor and smooth down the surface of the concrete along the opposite edges of the joint, as well as to support the depositor properly in the concrete. The chute 35 has spaced flat vertical side walls located close together, with a space between them preferably open at the upper edge to receive and accommodate a strip 38 that is deposited in the concrete to produce the joint. The chute or blade provides a slotted joint aligning or depositing member which is movable longitudinally of itself from the joint strip, and said blade or member supports the strip as it emerges and deposits the strip in true alignment. Said strip may be of paper, rubber, metal, composition or other suitable material, and may be of different thicknesses for various requirements, and, as shown in Figs. 1 and 5, the strip 8 is supplied in a roll on a spool or reel 39 mounted in the frame 30 at one side of the forward end of the chute 38. A roller 40 is carried by the front end of the chute for guiding the strip 38 from the roll into the forward end of the chute to pass rearwardly through the chute as the machine moves forwardly in depositing the strip into the concrete. The forward end of the chute is pivoted, as at 41, to the frame in order to permit the rear end of the chute and the depositor 36 to be raised and lowered out of and into the concrete.

The depositor 36 is raised and lowered by means of an adjusting screw 42 screw-threaded in the frame above the float 37. A link 43 connects the lower end of the screw 42 and the float 37, there being a pivot and swivel connection 44 between the link and screw, and said link has a pin and slot connection 45 with the float 37, permitting slight vertical vibration of the float relatively to said link. By adjusting the screw upwardly and downwardly it will raise and lower the float 37 and depositor 36.

A roller 46 or other suitable device is carried by the float 37 beyond the forward edge of the float and is disposed across the upper edges of the chute or blade 35 to hold the strip down in the chute where it passes below the float 37. The roller 46 will also roll or depress the concrete on both sides of the blade or joint strip. As the machine advances, the rolling down of the concrete will solidify or compact the concrete and bring it down level with the surface of the road. The desired pressure may be applied according to the density of the concrete. The roller or finishing member 46 may be used with or without the float, and the float may also be used with or without the roller, both the roller and float serving to finish the surface of the concrete along the joint. The roller will compact or depress the concrete along the installing blade progressively as the machine advances forward, rolling the concrete down flush with the top of the blade or installer.

The float 37 and depositor 36 are given a slight vertical vibration, in the operation of the machine, to facilitate the depositing of the material in the concrete, the movement of the depositor forwardly in the concrete, and the tamping of the concrete by the float 37. Thus, a plunger rod 47 is slidable vertically in the frame with its lower end adapted to bear on the float 37, and a coiled spring 48 surrounds the rod and is confined between the frame and an adjustable collar 49 on the rod to force the rod downwardly with a sharp motion. The upper end of the rod carries a roller 50 disposed over a cam 51 mounted in the frame, whereby the rotation of said cam will raise the roller 50 and rod 47 and then release the roller so that the spring 48 forces the rod downwardly with a quick motion against the float 37. The rod 47 is vibrated with a rapid motion so as to jar or vibrate the depositor 36 and float 37 vertically. This will facilitate the discharge of the strip or material from the depositor, and in vibrating the depositor it will also pass forwardly in the concrete more easily, so as to reduce the amount of draft required to propel the machine. Also, the float 37 being vibrated over the concrete will have a tamping action to tamp and smooth down the surface of the concrete along the opposite sides of the joint.

As shown, the cam 51 is connected by a sprocket chain 52 with longitudinal power shaft 53 carried by the frame 30 at one side, said shaft 53 being driven by an engine or other prime mover 54, for forward and backward movement and a clutch 55 being preferably provided for connecting the cam 51 with and disconnecting it from the shaft 53. When the float 37 is raised by the screw 52, the rod 47 will be raised with the float against the influence of the spring 48, thereby lifting the roller 50 away from the cam 51, as seen in Fig. 3.

A cleaving implement 56 is slidably mounted in the frame in front of the chute 35 and in the longitudinal line of the depositor 36, said implement being connected at its upper end with an eccentric 57 similar to the eccentric 57' shown in Fig. 7, whereby the implement is reciprocated vertically. The eccentric 57 is connected by a sprocket chain 58 with the power shaft 53, a clutch 59 being provided on said shaft to make and break the connection. The implement 56 being reciprocated is forced down into and retracted from the concrete, thereby pushing down and deflecting to opposite sides any stones, pebbles and other solid particles in the line of the joint. This clears the path for the depositor, by removing from the line of movement thereof the stones and other solid objects, allowing the mortar to flow or slump into the cleft when the implement withdraws and advances for the successive stroke, and enabling the depositor to move forwardly in the concrete without encountering obstructions. The implement 56 may have shoulders 60 at opposite sides to come into contact with the surface of the concrete for tamping down the concrete at the opposite sides of the cut made in the concrete by the implement.

The machine is moved longitudinally over the roadway one or more times, depending on the plastic condition of the concrete, it being understood that this machine follows rearwardly of the regular screeding machine well known in the art and this machine cuts the longitudinal groove and is equipped to do the necessary floating and the installing of joint material; the transverse float member 94 reciprocates over the surface of

the roadway progressively as the machine moves forward with the cleaving implement 56 operating in the plastic concrete and the longitudinal blade or joint depositor may be trailed longitudinally of itself in the cleft as the machine moves forward to cause a further separation of the coarse aggregate and to smooth the vertical walls of the cleft to avoid honeycombing before the installation of the joint strip; as heretofore described, it is understood that the cleaving and smoothing operations may be performed a number of times to produce the required results. When it is desired to produce an open longitudinal joint, the blade may be drawn through the plastic concrete the required number of times with the float 94 reciprocating over the cleavage; in the last passing of the blade in the concrete, the float 94 is raised from the surface so as to produce a clean open joint. It has been found practical in concrete base courses of bituminous surface or so-called black top roads to create a longitudinal plane of weakness by producing a cleavage line longitudinally of the roadway by separating the stones and coarse aggregate, producing a longitudinal vein of mortar and finishing over the surface of the roadway without inserting a joint strip to induce the road to crack longitudinally along the weakened plane thus created. However, if a joint strip is to be inserted in the cleavage, then the surfacing member is permitted to reciprocate transversely over the surface of the concrete, and over the joint strip to smooth the plastic concrete adjacent to the strip progressively as the strip emerges from the installing blade or depositor; the depositor supports the strip in a vertical position and to the proper elevation as it emerges from the depositing, and while held in this position, the surfacer reciprocates transversely over the joint strip while it is being held in a vertical position and to the proper elevation and smooths the concrete adjacent to and over the joint strip, which is in tension as the machine moves progressively forward and the various operations are simultaneously performed. When the required length of strip has been deposited, the strip is cut as may be required—if the said strip is being unwound from a roll. If short lengths of strip are being used, it should not be necessary to shorten these strip lengths as they are usually of a length of from 5' to 10' for the convenience of handling and installing. These short lengths of strip are only used when a thicker joint strip is being installed as it would be impracticable to furnish thick strips $\frac{1}{4}$ " or $\frac{3}{8}$ " in large rolls. It is to be understood that when the machine is reversed or backed up for a successive forward operation, the installing blade or depositor is raised from contact with the plastic concrete. The cleaving member 56, however, may remain in operating position in the concrete at all times and may operate in the plastic concrete both during the forward and rearward movement of the machine.

The machine as described up to this point is complete for the depositing in the concrete of the strip 38, the operation being simple and rapid. Thus, with the depositor 36 in the concrete and the float 37 bearing on the concrete, the machine is moved forwardly, and the strip 38 projects rearwardly out of the nozzle formed by the rear open end of the depositor 36, whereby as the machine moves forwardly the strip is pulled from the depositor 36 and chute 35. The strip passes down the chute 35 and through the de-

positor 36 to the concrete, with the upper edge of the strip flush with or slightly below the surface of the concrete. The implement 56 prepared the way for the depositor, by depressing and deflecting to opposite sides the stones, pebbles and other particles, permitting the mortar to slump or flow into the separation in order that the chute 35 and depositor may move forwardly freely in the concrete. The float 37 smooths down the surface of the concrete at opposite sides of the depositor 36, and the rod or vibrator 47 being actuated will result in said float tamping the concrete. The vibration will also facilitate the forward movement of the depositor in the concrete and the discharge of the strip through the depositor. Thus, as the machine moves forwardly the strip is deposited in the concrete in rear of the depositor 36. Said depositor serves as a plow moving in the plastic concrete to open up a furrow or incision in which the strip is deposited, said strip passing out or being discharged from the depositor or blade 36 that opens up the concrete. The machine in travelling on the side rails or forms will result in the strip being deposited in the concrete parallel with one side edge of the road, thereby providing an accurate joint. The present machine follows closely behind the machine or devices which are used to finish the surface of the concrete. Thus, the concrete is poured from the concrete mixer on the sub-base between the side rails and is then struck-off, tamped, floated, rolled and otherwise surfaced and finished, and the present machine follows the finishing of the surface of the concrete to deposit the strip or joint neatly in the concrete.

As shown in Figs. 5 and 8, the depositor 36 has its lower portion of curved cross-section, so that the lower portion of the strip 38 will be of curved, deformed, cross-section, as at 61. The strip is flat in moving down the chute 38 and the cross-section is gradually changed where the chute merges into the depositor, so as to bend or fold the strip transversely as it enters and passes through the depositor. The strip may therefore be bent or deformed into different cross-sections, according to the cross-sectional form of the depositor. By the provision of the deformed portion 61 of the strip 38, when deposited in the concrete, the slabs at the opposite sides of the strip or joint will have a tongue and groove interlocking them against relative vertical displacement, and providing a hinge joint to permit the slabs to flex upwardly and downwardly. After the concrete has hardened it will ultimately break or crack along the strip 38, and between the lower edge of said strip and the sub-base, as shown in Fig. 8. In this manner, the fracture or break extends along the line of the strip or joint, instead of along an irregular line. The float or trowel 37 may also round off the edges of the concrete at the opposite sides of the strip 38, or such edging may be done by hand in rear of the depositor, so as to reduce to a minimum the possibility of the concrete chipping off along the joint.

In lieu of the strip or solid material 38 there can be deposited in the concrete plastic or semi-liquid material, the float 37 having an opening or inlet 62 for delivering the material downwardly into the depositor 36 to discharge from the rear end of the depositor. To prevent the material passing forwardly in the depositor, a filler 63 of any suitable kind is inserted in the depositor in front of the opening 62, and directs the material rearwardly. The material is contained in a tank or reservoir 64 carried by the frame adja-

cent to the rear end of the depositor 36, and a hose or other flexible connection 65 leads from the tank 64 to the opening 62. The material may be delivered under pressure into and through the depositor. Thus, a piston or follower 66 works in the tank 64 and has an upwardly extending screw-threaded stem 67 passing through the top or upper end of the tank to force the piston down by the rotation of the stem. The stem 67 may be rotated by hand or may be operably connected with the propelling or power means to be operated by power. The pressure means may also be of the kind shown in Figs. 25 and 26 and described hereinafter.

When using the plastic or semi-liquid material instead of the strip 38, the operation is substantially the same, the depositor 36 moving forwardly in the plastic concrete, and as it moves forwardly the material is discharged through the rear end of the depositor, thereby forming the joint of substantially the same construction as that formed by the strip, providing the plastic material is of a semi-plastic consistency as shown in Fig. 8. Tar, asphalt, heavy oil, and other similar plastic or semi-liquid materials may be used. By using a light oil or a liquid emulsion, a plane of weakness or separation may be created in the plastic concrete; the tubular depositor passing through the plastic material will separate the coarse stone and eject the liquid joint material from the rear of the depositor, and immediately in the rear of the depositor, the stone will slump back more or less in original overlapping position, provided the concrete is in a very plastic state; the oil or emulsified solution will have coated the materials so as to prevent a bond or the re-uniting of the material along an irregular cleavage plane but substantially in a straight longitudinal line so that by refloating the surface of the concrete it will agitate the stones and tend to rearrange the stones in an overlapping condition so that they will assume more or less their original position, which will serve to produce an interlocking element for the entire thickness of the slab, at the same time producing a cleavage line substantially longitudinally of the roadway. The material may be such as to become hard or semi-hard, or may be such as to remain semi-plastic to serve as a seal for the crack or break between the opposite sections or slabs of concrete.

The machine may be propelled by power. As shown, a transverse shaft 68 is mounted in the frame at the rear end thereof and is geared, as at 69, to the power shaft 53, a clutch 70 being provided for opening and closing the connection to stop and start the movement of the machine on the rails 32. Sprocket chains 71 connect the shaft 68 and rear wheels 31 and are slidable transversely with said rear wheels, sprocket wheels 72 being feathered or splined on the shaft 68, and bars 73 being slidably mounted on the axles 33 and shaft 68 to move each sprocket chain 71 transversely as a unit with the corresponding wheel 31.

Longitudinal platforms or running boards 74 are mounted in the frame at the opposite sides of the chute 35 and float 37 to support workmen.

The machine is also equipped with means for producing or installing transverse joints, and said means includes a secondary carriage mounted on the main carriage for transverse movement across the road. The secondary carriage 75 has wheels or rollers 76 movable along transverse rails or guides 77 with which the main frame 30 is provided, and the transverse joint cutting means or device is carried by the carriage 75 and, in gen-

eral respects, involves the same principles as the longitudinal joint means or device. The depositor 36' comprises the lower flattened terminal portion of a vertical tube or chute 35', said depositor 36' being of suitable form to produce a joint of the desired cross-section (the same as the depositor 36 as shown in Figs. 3 and 4). The rear edge of the depositor 36' is open for the discharge of the plastic or semi-liquid material which flows down through the tube 35'. The tube 35' extends through a vertical tubular adjusting screw 42' that is screw-threaded within the bottom portion of the frame or carriage 75, and collars 78 are secured on the tube above and below the screw so that the depositor moves up and down with said screw. The screw has a hand wheel 79 at its upper end for rotating the screw to raise and lower the depositor. A tank or reservoir 64' for the material is mounted on the carriage 75 and a hose or flexible connection 65' leads from the tank to the upper end of the tube 35', and a piston or follower 66' operated by a screw or other means works in the tank 64' to force the material therefrom under pressure. The tube 35' has an upstanding stem 80 of non-circular section slidable through a guide 81 to prevent the tube 35' and depositor 36' from turning.

A spader or deflecting plunger 56' is slidable in the bottom portion of the carriage or frame 75 and is operated by an eccentric 57' mounted on a shaft 82 journaled in the carriage or frame 75, and the spader 56', like the implement 56 hereinafore described, has the shoulders 50' at opposite sides to tamp down the concrete. A bevel gear 83 is secured on the shaft 82 and meshes with a bevel gear 84 that is splined or feathered on a transverse shaft 85 journaled at its ends on the frame 30. The gear 84 is movable with the carriage 75 so that the shaft 82 is driven from the shaft 85 in the different positions of the carriage 75. The shaft 85 is geared, as at 86, to the power shaft 53, a clutch 87 being provided for making and breaking the connection. Although the several clutches 55, 59, 70 and 87 are shown as mounted on the shaft 85, they may be located at other suitable points of the operating gearing.

The carriage 75 may also be moved manually back and forth along the rails or guides 77, or may be moved by power, such as a sprocket chain 88 extending around the sprocket wheels on the shaft 82 and the axles of the wheels 76.

When the transverse joint is cut, the frame 30 is maintained stationary. The carriage 75 is started at one side of the road with the spader 56' in advance of the depositor 36'. The spader is operated back and forth the required number of times so as to depress and deflect the stones and other particles out of the path of the depositor, and after the spader has moved sufficiently away from the corresponding side rail 32, the depositor 36' is moved downwardly into the plastic concrete by screwing the screw 42' downwardly. The carriage 75 is then moved transversely across the road so that the material discharged from the depositor 36' will produce the transverse joint of the desired cross-section. The spader 56' is stopped when it reaches the opposite side rail, and is retracted from or stopped above the concrete, to permit the depositor 36' to move close adjacent to the rail in finishing the joint. The depositor is then retracted from the concrete by raising the screw 42'. The longitudinal joint may then be continued so as to break through or intersect the transverse joint, and it is also possible to make the transverse joint in two parts

extending from the side edges to points near but spaced from the longitudinal joint line. Thus, in passing over the line of the longitudinal joint, the depositor 36' may be retracted from the concrete to pass over the longitudinal joint line, and may then be again projected into the concrete, as will be apparent. Any rough portions left in the production of the transverse joint may be finished off by hand, such as at the point where the depositor is withdrawn from the concrete. As the machine advances, the float 94 will reciprocate over the cleavage or joint to smooth the surface of the concrete.

Transverse platforms or running boards 74' are mounted in the frame 30 in front and in rear of the line of movement of the transverse joint installing means to support the workmen when producing and finishing the joints.

Figs. 9, 10 and 11 illustrate a modification wherein premolded strips of limited length are used in lieu of the strip 38 of long length as hereinbefore described. The strips 38a may be about ten feet long (more or less), and are inserted downwardly into the chute 35a between the spaced side walls thereof to pass through the depositor 36a into the concrete. Wire staples 89 or other coupling means are used for connecting the strips end to end, and, as shown, the sides of the chute 35a have openings 90 to permit the staples or coupling members 89 to be inserted and applied, this being done manually as the strips are withdrawn from the chute. The strips 38a may be thick, and, as shown, the depositor 36a has flat sides so that the thick strips are not deformed.

The strips 38a, as shown in Fig. 2, may be supported in hook-shaped hangers or brackets 91 with which the frame 30 is provided, so that a workman on the platforms 74 may conveniently remove the strips 38a and insert them in the chute 35a as needed. This enables premolded or preformed strips to be used which are of a thickness or material so as not to be capable of being rolled up like the strip 38, and said strips or sections 38a follow one another into the concrete from the depositor by being coupled together end to end.

Fig. 12 shows steel strips 38b as having their ends formed with suitable hooks or portions 89b to interlock, a limited number of strips may be coupled together by simply inserting them in the chute 35b, to be trailed or drawn longitudinally through the plastic concrete by connecting the end of the line of joint plates to the chute so that when the machine advances the chute 35b will register in the cleft produced by the spader 56 and the steel joint strips 35b, which may be approximately 100' in length more or less, will be drawn longitudinally through the plastic concrete while the surfacing float 94 reciprocates transversely over the strips simultaneously as the machine advances as the strips are drawn longitudinally through the plastic concrete for a suitable distance, depending on the consistency of the concrete. The joint plates may then be disengaged from the chute and left at rest in the concrete so that the machine may advance ahead and cut the groove along the line of the joint to separate the stones and coarser particles and prepare the defined longitudinal vein of mortar as previously described, through which to again move the longitudinal train of joint plates as described.

Figs. 13 to 17, inclusive, show joints of different cross sections that may be deposited or produced,

which are a few of the variations that are possible, as will be apparent. The joint strip or material 38c shown in Fig. 13 is wider at its lower edge than at its upper edge, or is of dovetail cross-section to be securely anchored in the concrete. The strip or material 38d shown in Fig. 14 is of T-shaped cross-section, to divide the concrete and provide a broad traffic line at the surface of the concrete. Fig. 15 shows the strip or material 38e narrow at its lower edge and increasing in thickness to its upper edge to provide a wider upper edge portion. Fig. 16 shows the strip or material 38f having grooves in its opposite sides to form tongues on the adjacent edge portions of the slabs, thereby providing a double hinge joint, after the concrete breaks below the strip. Fig. 17 shows the strip or material 38g as being sinuous from its upper to its lower edge. It will be apparent that the depositors are of cross-sections corresponding to the shapes of the strips or material deposited in the concrete, as seen by reference to Figs. 13-17. The strips or material may be of various colors, especially when they are used to provide traffic lines on the surface of the concrete as well as forming joints to divide the concrete. It is thus apparent that strips of solid, plastic or semi-liquid material may be deposited in the plastic concrete, and the material may be of different colors and may extend down into the concrete to different depths. It is preferable, however, to leave the strip spaced above the sub-base, allowing for a natural break or fracture between the strip and sub-base. The concrete being plastic will flow together behind the depositor against the opposite sides of the strip or material deposited in the concrete.

Figs. 18 and 19 illustrate a transverse platform or running board 92 mounted on brackets 93 at the rear end of the machine in order to support workmen for finishing the joints by hand in rear of the depositor, the tank 64 being mounted at one side of the float 37. These figures also show the use of a finishing belt 94 at the rear of the machine for finishing the surface of the concrete over the longitudinal and transverse joints. The float 94 has its terminals wound on spindles 95 extending rearwardly from and rotatable within brackets 96 that are adjustable on a transverse shaft 97 mounted in the brackets 93 in rear of the platform 92. Set screws 98 are used for securing the spindles 95 in the brackets 96 and said brackets on the shaft 97, to provide for adjustments. A lever 99 or other operating means is connected to the shaft 97 to enable said shaft to be reciprocated and rocked. Thus, the shaft may be turned to let the belt 94 down on the surface of the concrete or to raise the belt off the concrete, and the shaft is reciprocated to reciprocate the belt over the surface of the concrete for finishing the surface, especially over the joints. The machine may thus have trailing finishing means to operate on the surface of the concrete over the joints formed or deposited in the concrete.

Fig. 20 shows a barrel or drum 64h providing a tank to hold the plastic or semi-liquid material, with a hose 65h leading to the float 37h and depositor 36h. An air pump 66h is connected to the top of the barrel to force air into the barrel in order to discharge the material therefrom under the desired pressure. The pump 66h may be a hand pump, as shown, or a power pump. The float 37h has an opening 100 to receive a bar or stopper 63h when the plastic or semi-

liquid material is used, to close the depositor 36h in front of the hose 65h, said stopper 63h being withdrawn when the strip passes down the chute 35h through the depositor in lieu of the plastic or semi-liquid material. It is understood that if so desired a joint strip may be passed through the chute simultaneously with a plastic material or composition 36h so that the strip may be coated with a film of suitable material while it is being deposited; this method may apply to a strip of premolded material or paper, which is left permanently in the concrete. This coating of tar or asphaltic or emulsion—as may be required—will assist in preserving the material and also seal the crack. It is also to be understood that this same method may be used when passing steel plates through the chute, except that oil may be used for lubricating the plates progressively as the plates pass through the chute. The film of oil will prevent the plate from adhering to the concrete and will facilitate the easy movement of the joint plates through or from the concrete. The opening 100 may be temporarily sealed while using both materials as explained.

Fig. 20 also shows an adjustable mounting for the chute 35h. Thus, the upper terminal of the chute 35h is mounted on a transverse shaft 101 disposed in bearings 102 slidable vertically in slotted guides 103 carried by brackets 104 supported by the frame, and adjusting screws 105 are carried by the guides 103 for adjusting the bearings 102 vertically, to raise and lower the shaft 101 and chute 35h. This enables the forward end of the chute to be raised and lowered, and the chute may also be adjusted transversely between the brackets 104, said brackets being spaced apart transversely. One or more collars 106 having set screws may be provided on the shaft 101 to maintain the transverse adjustment of the chute 35h.

Fig. 21 illustrates a depositor 36i having a receptacle 107 to hold a folded strip 38i. Said receptacle is open at the top through the float 37i so that the strip may be readily inserted in the receptacle, to pass through the rear portion 108 of the depositor which may be of any suitable shape so as to deform the strip if desired, as shown. This type of depositor eliminates the use of the chute, and the forward end portion 109 of the depositor serves as a shin to separate the concrete for the passage of the receptacle or widened portion of the depositor, the concrete flowing together again behind the receptacle 107 to close in on the strip in rear of the depositor. A shank 35i extends forwardly and upwardly from the forward end of the float 37i and has an eye or bearing 110 to connect the device with the machine. A spader 56i slides vertically through the shank 35i to work up and down in the concrete in advance of the depositor so as to depress and deflect stones and other particles out of the path of the depositor. The spader 56i has flanges or lugs 111 to strike the shank 35i and vibrate the depositor vertically similar to the action of the reciprocating rod 47 hereinbefore described.

The receptacle 107 is elongated longitudinally, and the strip 38i is folded together in zig-zag manner. With a thin strip the receptacle 107 may not be as wide as shown, the illustration being exaggerated for purpose of clearness.

Fig. 22 shows a modification of the device shown in Fig. 21 in that the receptacle 107' of the depositor is circular or cylindrical, with the strip 150

38/ rolled up and deposited in said receptacle, so as to unroll in passing through the rear portion of the depositor into the concrete.

The devices shown in Figs. 21 and 22 are especially useful for producing transverse joints. Thus, a strip of predetermined length can be placed in the receptacle of the depositor for producing transverse or longitudinal joints.

Fig. 23 shows a depositor 36k having in one or both of its sides the vertical slots or openings 112 through which the plastic or semi-liquid may be discharged at one or both sides of the depositor. Said slots or openings are below the float 37k which has the opening 62k for the delivery of the material downwardly into the depositor. The depositor and float are carried by a beam 35k. In providing a plurality of discharge slots or openings 112 the material may flow from one or more of them even though some of the slots may be clogged by the concrete.

Fig. 24 shows a depositor 36t of short length below the rear end of the float or trowel 37t, said float and depositor being secured below a beam or shank 35t. The beam 35t and float have the opening 62t to receive the material from the hose 65t to pass into the depositor and through the rear open end of said depositor. The spader 56t reciprocates vertically through the beam 35t and float in front of the depositor, and is connected by a pitman or link 113 with a crank disk 57t to reciprocate said spader.

Figs. 25 and 26 illustrate different means for obtaining pressure to discharge the plastic or semi-liquid material. As shown in Fig. 25 a pump cylinder 114 is connected, as at 115, with the top of the barrel or tank 64m containing the material, and the piston 116 working in said cylinder has an upstanding stem 117 on which is secured a receptacle or pan 118 for holding sand, gravel or other material to impose the desired weight on the piston 116. In this matter, the piston 116 is depressed under the desired weight, so as to obtain the desired pressure on the material in the tank or barrel 64m. As shown in Fig. 26 the cylinder 114' is mounted on the barrel or tank 64n, with a connection 115' between the lower end of the cylinder and the top of the tank. The upstanding stem 117' of the piston 116' has ratchet teeth 119 for the engagement of a pawl 120 carried by a lever 121 fulcrumed to a post 122 rising from the cylinder, and a weight 123 is adjustable on the lever 121 to supply the necessary power for depressing the piston 116', it being noted that said weight may be adjusted to regulate the pressure on the material in the tank or barrel 64n. After the lever 121 has swung downwardly below a horizontal position it may be raised again to engage the pawl 120 with ratchet teeth higher up, and the weight may be raised several times during the movement of the piston 116' from its uppermost to its lowermost position. In both of the devices shown in Figs. 25 and 26 pistons may be raised again after being moved to their lowermost positions, so as to repeat the operations. Also, in both devices the pressure of the material may be regulated by the amount of weight used on the pistons.

It is understood that the joint cutting and installing implement in Figure 21 may be operated manually in the plastic concrete without being attached to a traveling bridge. It will be apparent that after the stone and coarse aggregate have been separated along a predetermined line of joint, this implement may be moved through the vein of mortar to produce a de-

formed separation or install a joint strip or if desired a liquid material may be used. It is understood that when this implement is moved through the concrete by hand, a suitable handle could be provided, and further that when operated manually, the use of the spading implement 56i is dispensed with.

Having thus described the invention, what is claimed as new is:—

1. A machine for producing a joint or traffic line in concrete comprising a carriage movable over the concrete, a depositor carried by the carriage and movable longitudinally in the concrete to form a groove therein and having provision for the discharge of material therefrom into said groove, and means carried by the carriage to work in the concrete in advance of the depositor for deflecting stones and solid particles out of the path of the depositor.

2. A machine for producing a joint or traffic line in concrete comprising a carriage movable over the concrete, a depositor carried by the carriage and movable longitudinally in the concrete and having provision for the discharge of material therefrom into the concrete, and a vertically reciprocatory spader carried by the machine to work vertically in the concrete in advance of the depositor for depressing and deflecting to opposite sides stones and other solid particles from the path of the depositor.

3. A machine for producing a joint or traffic line in concrete comprising a carriage movable over the concrete, a depositor carried by the carriage and movable longitudinally in the concrete, said depositor having provision for the discharge of material therefrom into the concrete, and means for vibrating said depositor.

4. A machine for producing a joint or traffic line in concrete comprising a carriage movable over the concrete, a float carried by the carriage and movable longitudinally on the concrete, a depositor under the float to move longitudinally in the concrete and having provision for the discharge of material therefrom, means mounted on the carriage for delivering material into the depositor, and means carried by the carriage for vibrating said float and depositor.

5. A machine for producing a joint or traffic line in concrete comprising a carriage movable over the concrete, a float carried by the carriage and movable longitudinally on the concrete, a depositor under the float to move longitudinally in the concrete and having provision for the discharge of material therefrom, means mounted on the carriage for delivering material into the depositor, and means mounted on the carriage for producing impacts downwardly on said float and depositor progressively as the float and the depositor move longitudinally through the plastic concrete.

6. A machine for producing a joint or traffic line in concrete comprising a carriage movable over the concrete, a rearwardly and downwardly extending member having its forward end pivotally connected with the carriage and having a float at its rear end to move on the concrete and a depending depositor below the float to move in the concrete, said depositor having provision for the discharge of material into the concrete, means mounted on the carriage for supplying material into the depositor, and means for raising and lowering the rear portion of said member.

7. A machine for producing a joint or traffic line in concrete comprising a carriage movable

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- over the concrete, a rearwardly and downwardly extending member having its forward end pivotally connected with the carriage and having a float at its rear end to move on the concrete and a depending depositor below the float to move in the concrete, said depositor having provision for the discharge of material into the concrete, means mounted on the carriage for supplying material into the depositor, and means for vibrating the rear portion of said member.
8. A machine for producing a joint or traffic line in concrete comprising a carriage movable over the concrete, a rearwardly and downwardly extending member having its forward end pivotally connected with the carriage and having a float at its rear end to move on the concrete and a depending depositor below the float to move in the concrete, said depositor having provision for the discharge of material into the concrete, means mounted on the carriage for supplying material into the depositor, means for raising and lowering the rear portion of said member, and means for vibrating the rear portion of said member when the float is on the concrete.
9. A joint installing machine comprising a depositing blade having a longitudinal passage for the movement of a joint strip therethrough, the rear end portion of said blade being adapted to move in plastic concrete and said blade being inclined in front of said rear end portion to be disposed above the concrete.
10. A joint installing machine comprising a depositing blade having a longitudinal passage for the movement of a joint strip therethrough, the rear end portion of said blade being adapted to move in plastic concrete and said blade being inclined in front of said rear end portion to be disposed above the concrete, the portion of the blade in front of said rear end portion being open at the top to receive joint strips.
11. A joint installing machine comprising a depositing blade having a longitudinal passage for the movement of a joint strip therethrough, the rear end portion of said blade being adapted to move in plastic concrete and said blade being inclined in front of said rear end portion to be disposed above the concrete, and a member for finishing the surface of the concrete disposed above said rear end portion of the blade.
12. A joint installing machine comprising a depositing blade having a longitudinal passage for the movement of a joint strip therethrough, the rear end portion of said blade being adapted to move in plastic concrete and said blade being inclined in front of said rear end portion to be disposed above the concrete, and a float secured on said rear end portion of the blade.
13. A joint installing machine comprising a depositing blade having a longitudinal passage for the movement of a joint strip therethrough, the rear end portion of said blade being adapted to move in plastic concrete and said blade being inclined in front of said rear end portion to be disposed above the concrete, and a float secured on said rear end portion of the blade, said blade being opened at the top in front of said float.
14. A joint installing machine comprising a float movable on plastic concrete to smooth same down, a depositor depending from said float to move in the plastic concrete for opening a groove therein, and means for supplying material through said depositor to move into and fill said groove.
15. A joint installing device comprising a blade movable in plastic concrete and having a passage for a joint strip, and a roller mounted over said blade to depress said strip and roll the concrete at opposite sides thereof.
16. A joint installing device comprising a blade movable in plastic concrete, and a roller movable with the blade and arranged for depressing the concrete adjacent to the blade.
17. A joint installing device comprising means for depositing a strip in plastic concrete, and a roller arranged for depressing said strip.
18. A joint installing device comprising means for depositing a strip in plastic concrete, and a roller arranged for depressing said strip and depressing the concrete at opposite sides of said strip.
19. A joint installing device comprising a blade movable in plastic concrete, and a vibratory roller mounted over said blade for depressing the concrete.
20. A joint installing device comprising a roller for depressing plastic concrete, and means for directing a joint strip into the plastic concrete under said roller.
21. A joint installing device comprising a roller for depressing plastic concrete, and a joint forming blade disposed under said roller.
22. A joint installing device comprising a blade movable in plastic concrete, and a float and a roller disposed above said blade to operate on the concrete.
23. A joint installing device comprising a blade movable forwardly in plastic concrete, and means operable in the concrete in advance of the blade for deflecting stones and coarser aggregate from the path of the blade.
24. A road joint installer comprising a frame movable over plastic concrete, and an inclined joint installing member whose lower end is disposed rearmost and adapted to move in the concrete, the forward end of said member being hingedly connected with the frame, and means between the frame and said member for raising and lowering the rear end of said member.
25. A road joint installer comprising a frame movable over plastic concrete, an inclined joint installing member whose lower end is disposed rearmost and adapted to move in the concrete, and means supporting said member from the frame for hingedly connecting the forward end of said member with the frame and for raising and lowering said member.
26. A road joint installer comprising a joint installing member movable in plastic concrete and adapted to guide joint strip longitudinally thereof and to move longitudinally from the strip, and a roller carried by said member to move on the upper edge of the strip.
27. A road joint installer comprising an inclined joint installing member whose lower end is disposed rearmost and adapted to move in plastic concrete, said member being adapted to guide a joint strip longitudinally thereof to pass from the rear end of said member, and a roller mounted at the rear end thereof to move on the upper edge of said strip.
28. A road joint installer comprising an inclined installing member whose lower end portion is disposed rearmost and adapted to move in plastic concrete, and a float affixed to and movable with the rear end portion of said member.
29. A road joint installer comprising a joint installing member having a slot open at the top for the downward deposit of a joint strip into the slot, and a roller to engage the upper edge of

said strip in said slot and depress the strip into plastic concrete.

30. A road joint installer comprising a joint installing member having a slot open at the top for the downward deposit of a joint strip, said member being adapted to be moved longitudinally of itself from the strip.

31. A road joint installer comprising a joint installing member movable in plastic concrete and having a longitudinal passage for a flexible joint strip, the rear end of said member being deformed to bend the strip into deformed cross-section.

32. A road joint installer comprising a member movable longitudinally along and from a flexible strip in plastic concrete and formed to bend the strip into deformed cross-section.

33. The method of installing a joint in unset concrete consisting in depositing a flexible strip in the concrete and moving deforming means longitudinally of the strip to bend same into deformed cross-section.

34. The method of installing a joint in plastic concrete consisting in moving a joint installing member in the concrete and delivering a flexible strip to move along and from said member to be deposited in the concrete, and bending the strip where it emerges from said member to give the strip a deformed cross-section.

35. The method of installing a joint in unset concrete consisting in delivering joint material into the plastic concrete along the line of a joint from a longitudinally moved member and deforming such material where it emerges from said member.

36. The method of installing a joint in unset concrete consisting in cleaving the concrete, positioning a joint installing member along the cleavage, depositing a joint strip downwardly in association with said member to be guided thereby into the cleavage, and moving said member longitudinally from the strip.

37. The method of installing a joint in unset concrete consisting in moving a joint installing member longitudinally in the concrete along the line of a joint, depositing joint strips in succession in said member to be delivered thereby into the concrete, and connecting said strips as they are deposited in said member.

38. A joint installing device comprising a joint aligning member having spaced side walls and an open top portion, and joint strips received through the open top portion between said side walls and having means for locking the ends of the joint strips together to form a continuous line of strips to be deposited in the plastic concrete.

39. A road building machine comprising a wheeled carriage operating on side forms and spanning a road under construction, a joint strip installing element carried by said carriage to support, align and deposit joint strips in the plastic concrete, and a surfacer mounted for transverse reciprocation on said carriage rearwardly of said joint strip installing element whereby to surface over the concrete and installed joint strips progressively as the machine moves over the roadway and as the joint strips emerge from the joint strip installing element.

40. A road building machine comprising a carriage, means for moving said carriage over a concrete roadway under construction, and an implement supported by and moved with said carriage and having a wide horizontal tubular top portion for forming a channel in the surface

of the concrete and for receiving traffic line material to be moved through said tubular top portion and deposited thereby into the channel, said implement also having a depending tubular blade underlying the said top portion for forming a joint groove in the concrete below the channel and for receiving joint material to be moved through the blade and deposited thereby into the joint groove.

41. A road joint installer comprising a float, and a blade adapted to be reciprocated through said float to separate the concrete below said float.

42. A road joint installer comprising a float to move over plastic concrete, a depositor depending from the float for depositing material in the concrete in rear of the depositor, and means to separate the concrete working below said float in front of the depositor.

43. A road joint installer comprising a float to move on plastic concrete, a depositor depending from said float to deposit joint material in the concrete in rear of the depositor, and a blade working through the float in front of said depositor for separating the concrete.

44. A road joint installer comprising a float to move over plastic concrete, and means below the float to separate the concrete and movable relatively to the float while the float is moving over the concrete.

45. A road joint installer comprising a float to move over plastic concrete, and a blade below the float to separate the concrete and movable relatively to the float while the float is moving over the concrete.

46. A road joint installer comprising a plate to move closely over plastic concrete, said plate having a slot therein, a blade disposed movably through said slot to separate the concrete below the plate, and means for operating said blade through the slot during the movement of the plate over the concrete.

47. The method of producing a separation of plastic concrete longitudinally of a roadway under construction, which consists in moving a flat slotted member longitudinally of itself over the roadway and working a cleaving implement through the slot to separate the concrete under the member.

48. The method of cleaving plastic concrete of a road under construction, which consists in moving a slotted member longitudinally over the roadway, and cleaving the plastic concrete under the slotted member by manipulating a cleaving implement through the slot to work in the concrete.

49. The method of cleaving plastic concrete of a road under construction, which consists in moving a slotted member over the plastic material, and moving a cleaving implement through the slot to cleave the concrete below the plate.

50. A joint cutting apparatus comprising a slotted member movable longitudinally of itself over a roadway under construction, a cleaving implement supported over the member and operating in the plastic concrete through the slot to separate the stones along the line of the joint, a blade underneath said member and following the cleavage rearwardly of the cleaving implement to open the cleavage and installing joint material rearwardly of the blade.

51. A joint cutting apparatus comprising a slotted member movable longitudinally of itself over plastic concrete, a cleaving implement supported over the member and projecting through the slot and into the plastic material to separate

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the stone and other aggregate under the member to produce a cleavage, and a blade following rearwardly of the cleaving implement to open the cleavage.

- 5 52. A joint producing apparatus comprising a floating member to move closely over plastic concrete of a road under construction, a blade to cleave the material under the member, and a cleaving implement associated with the float to
- 10 cleave the concrete forwardly of the blade.

53. A joint producing apparatus comprising a floating member to move closely over plastic concrete of a road under construction, an implement to cleave the plastic material under the float member, and means for reciprocating the implement.

JOHN N. HELTZEL.

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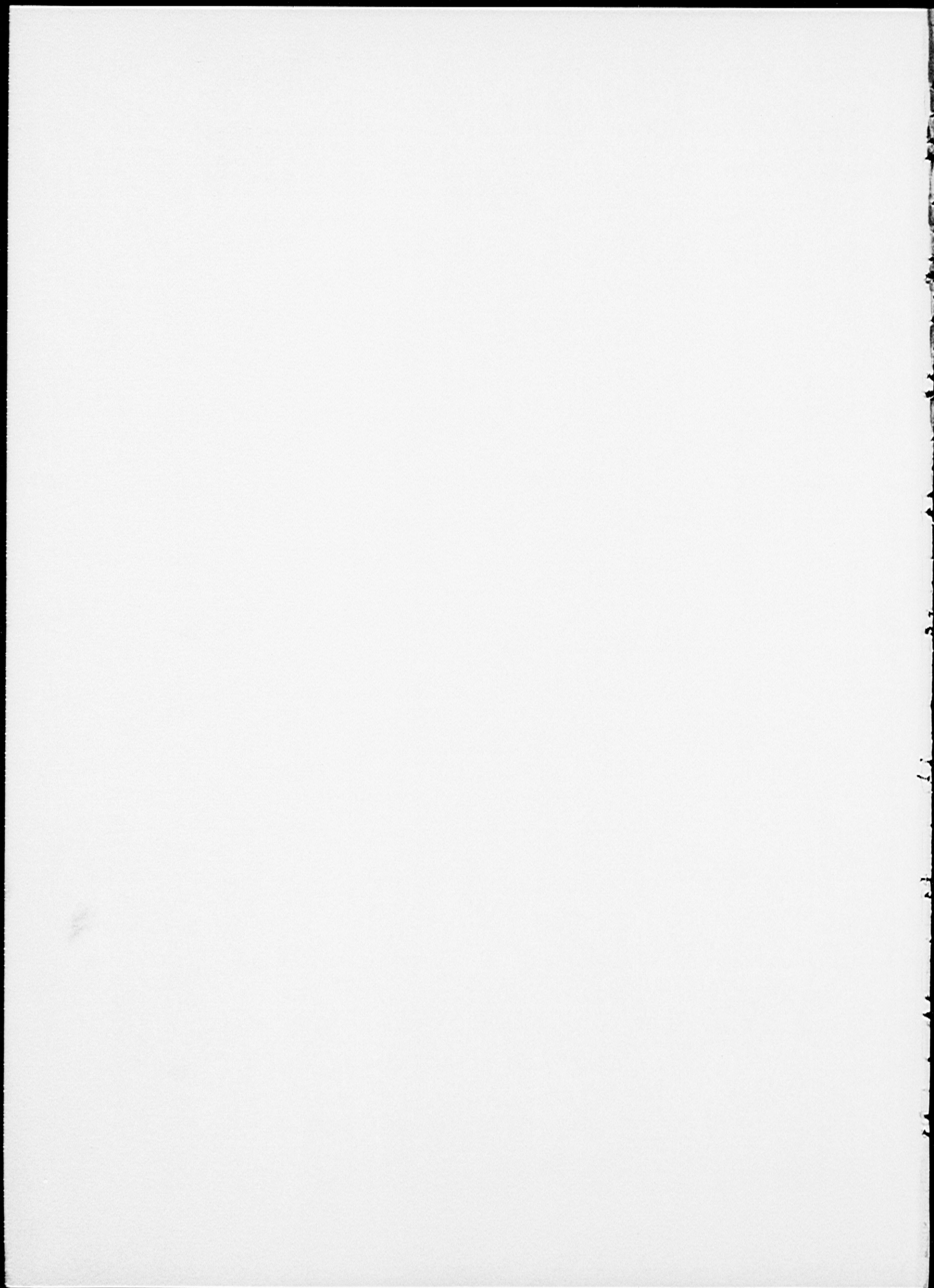
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April 28, 1953

Filed May 15, 1947

J. N. HELTZEL
APPARATUS FOR INSTALLING SEMIPLASTIC
JOINT MATERIAL IN CONCRETE ROADS

2,636,425

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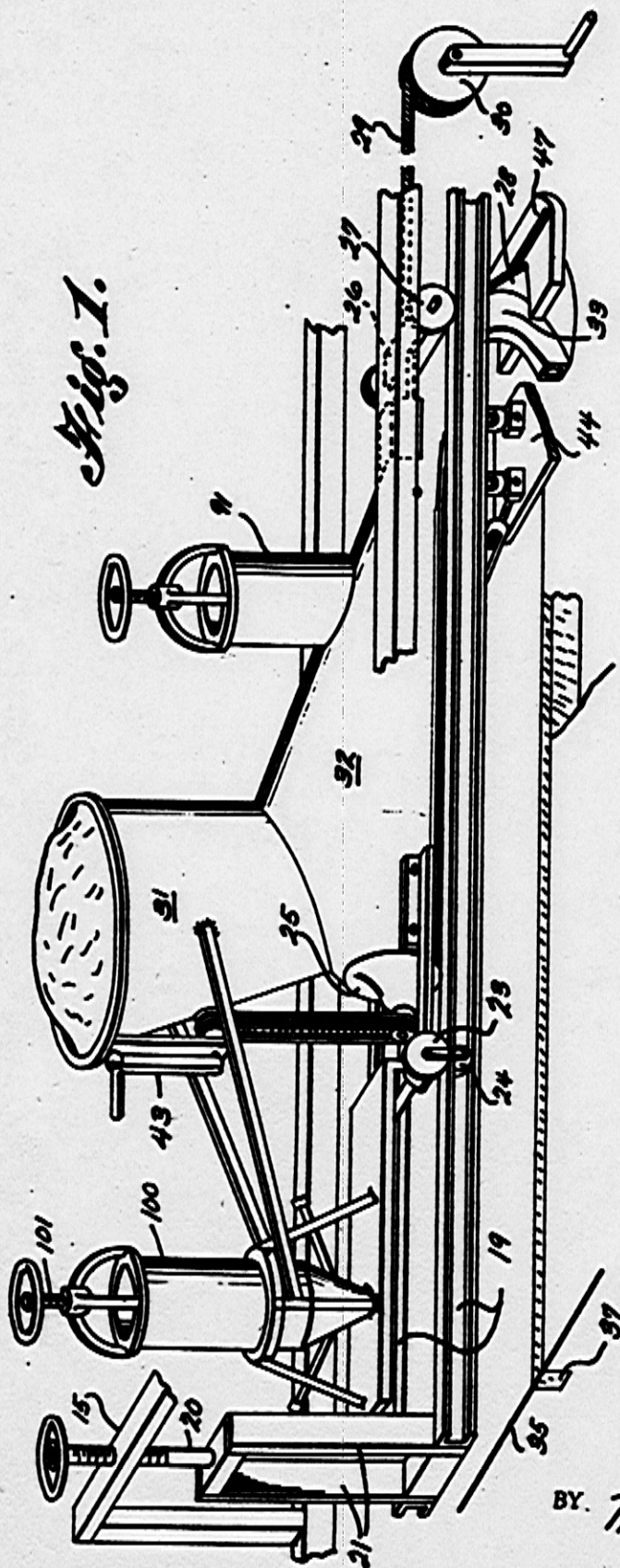
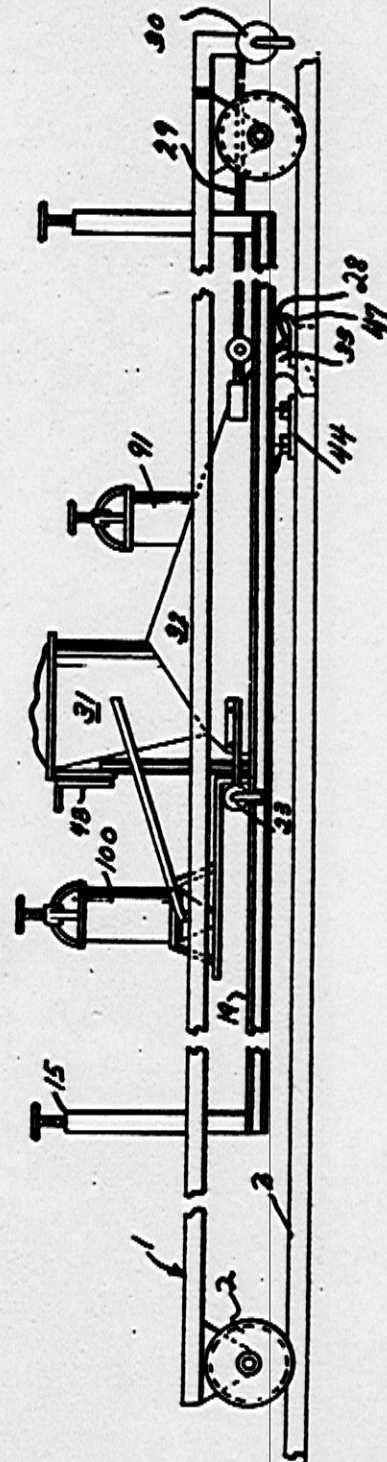


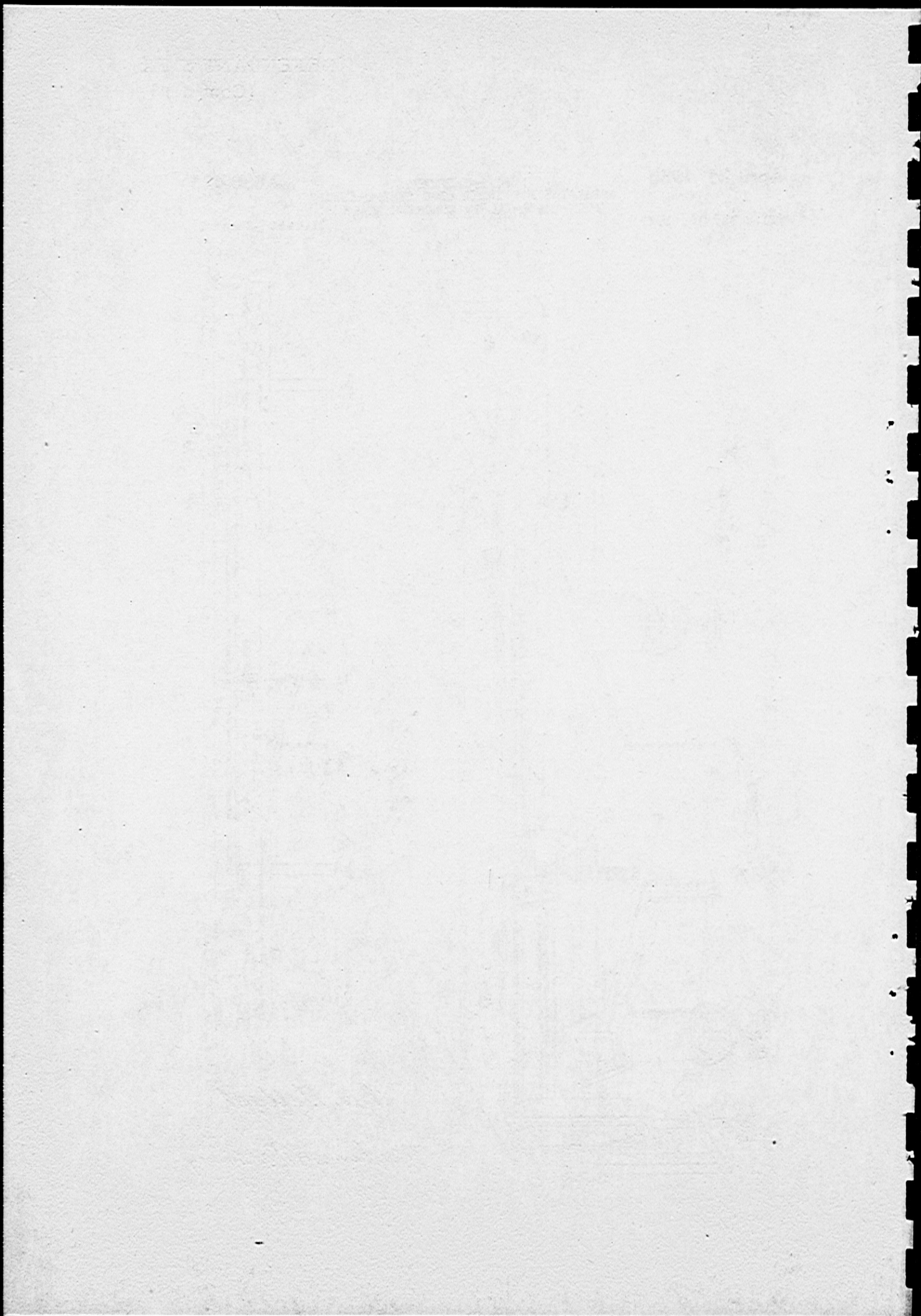
Fig. 3.



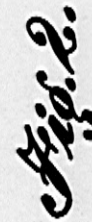
INVENTOR

J. N. Heltzel

BY *Mawhinney & Mawhinney*
ATTORNEYS



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BY *Mawhinney & Mawhinney*
ATTORNEYS

DEFENDANT'S EXHIBIT

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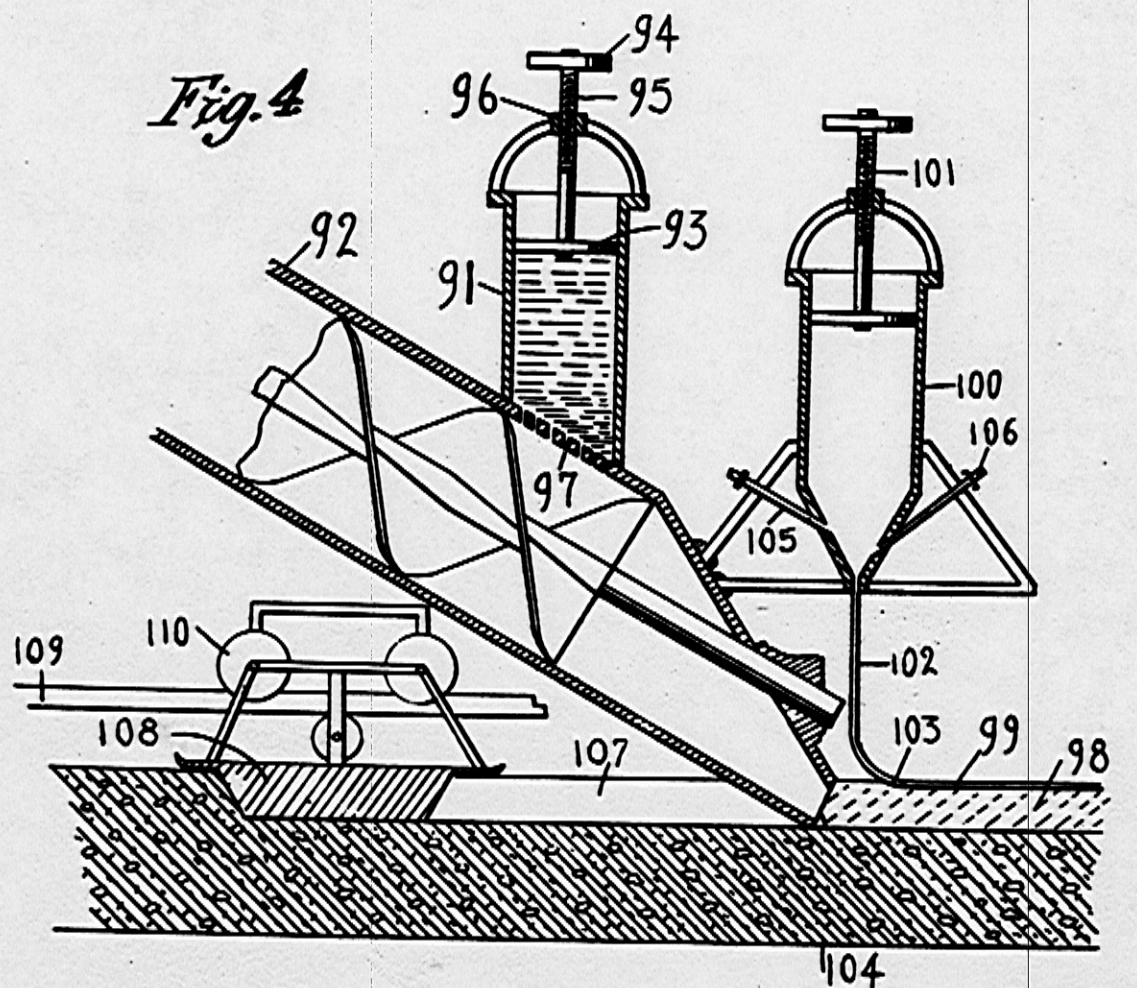
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2,636,425

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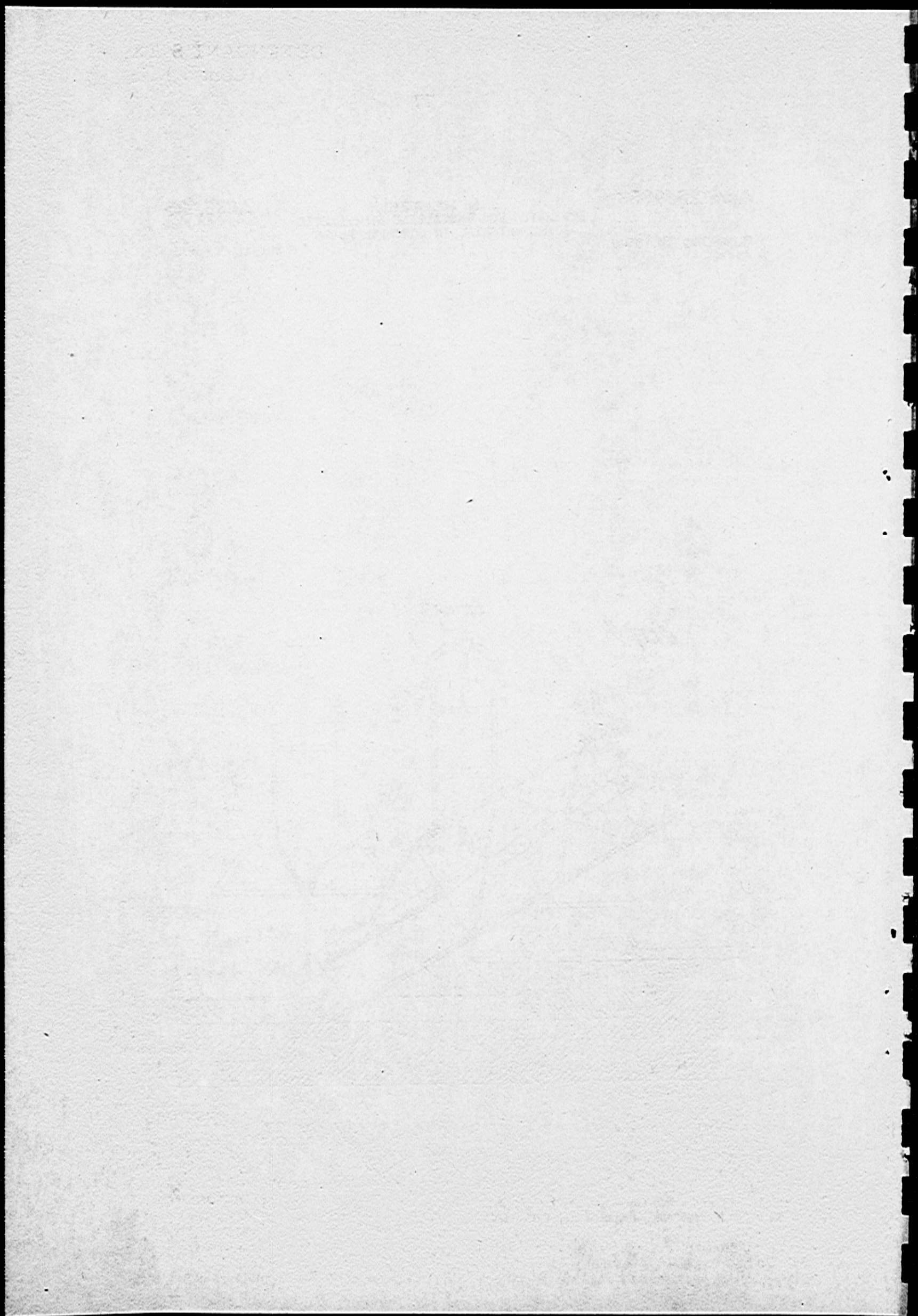


INVENTOR.

J. N. Heltzel

BY

Mawhinney & Mawhinney
ATTORNEYS.



Patented Apr. 28, 1953

2,636,425

UNITED STATES PATENT OFFICE

2,636,425

APPARATUS FOR INSTALLING SEMIPLASTIC JOINT MATERIAL IN CONCRETE ROADS

John N. Heltsel, Warren, Ohio; The Union Savings & Trust Company of Warren, Ohio, and Carl J. Heltsel, executors of said John N. Heltsel, deceased

Application May 15, 1947, Serial No. 742,316

6 Claims. (Cl. 94-46)

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The present invention relates to improvements in apparatus for installing semi-plastic joint material in concrete and the like roads, and has for an object certain improvements over my prior Patents Nos. 1,946,972, granted February 13, 1934 and No. 1,982,387, granted November 27, 1934.

The present invention relates more particularly to improved methods and apparatus for installing joints in plastic concrete surfaces to keep pace with later developments in plastic sealing materials which have been produced for the forming and sealing of expansion and contraction joints, in which the contraction joint formed by the so-called "dummy joint" does not extend entirely through the thickness of the slab but which forms a plane of weakness for controlling the breaking of the concrete below the slab whereby the road which is laid as a monolith is divided along well defined and predetermined lines into a number of slabs separated by the expansion and contraction joints to enable the slabs to expand and contract relatively to one another.

The invention is useful in installing joints in plastic concrete surfaces such as revetments, roads, airports, etc., for the purpose of controlling or minimizing the cracking of the plastic material during the dehydration of such plastic material.

Among the new developments of joint sealing materials are substances which are semi-plastic and resist flow through the conventional joint installation devices in that these substances require comparatively great pressure to project the same through the mechanisms in order to form the proper section of joint material as it emerges from the installing device and into the plastic concrete of the road.

A primary object of the present invention is to provide an improved method and apparatus for dealing with semi-plastic materials in that the present invention provides a screw for developing enormous pressure to advance the semi-plastic material through a hopper and ejection tube and to drive the same forcibly into the prepared groove in the concrete.

Another object of the invention is to provide in conjunction with the ejection installing mechanism groove forming and surfacing devices whereby the concrete in and around the installed joint may be immediately finished in a final manner.

Other objects of the invention are to improve the installing device and the apparatus for movably supporting the same upon the carriage

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whereby such installing device may be adjusted vertically and also has a longitudinal traverse on the main carriage to enable the same to move forwardly along the road while the main carriage remains stationary to perform its joint installing functions; and whereby subsequently the main carriage may be moved forwardly while the joint installing supplemental carriage remains stationary; all to the end of simplifying the installation of the new joint material in concrete roads and the consequent reduction in the expense of the same.

With the foregoing and other objects in view, the invention will be more fully described hereinafter and more particularly pointed out in the appended claims.

In the drawings, in which like parts are denoted by the same reference characters throughout the several views;

Figure 1 is a perspective view of a form of joint installing device constructed in accordance with the present invention and shown in connection with the concrete road under construction and with portions of a carriage traveling in the customary manner upon the side road forms;

Figure 2 is a vertical section taken through the hopper, worm tube, depositor and associated implements;

Figure 3 is a side elevational view of the joint installing device, with the supporting carriage diagrammatically illustrated;

Figure 4 is a vertical section taken through dual joint material depositors with lubricating means and grooving means associated therewith.

Referring more particularly to the drawings, 1 designates the main supporting carriage, which is supported as usual upon wheels 2 that travel on the side forms 3. Such construction is shown in my prior Patent 1,982,387 and is merely diagrammatically illustrated to show the supporting means for the joint installing device.

The main carriage may carry various implements for screeding, surfacing, compacting the road, forming grooves in which the joint material is to be installed, and various surfacing devices, all in accordance with common practice, some of which devices are disclosed in my above numbered prior patents.

One or more platforms carried by the main carriage 1 are provided on which workmen may move and be supported to attend to the operations of the agencies above referred to and the new joint installing device.

The joint installing device is slidable back and

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forth on the main carriage 1 and for this purpose a pair of rails 19 is supported in spaced relation from the main carriage 1. These rails 19 may be of channel or other form and they are preferably suspended from the main frame by an adjusting means 18 so that together with the installing device the same are adjustable vertically. For this purpose the ends of the rails 19 are carried by supporting bars 21 which are in turn carried by screw rods 20 swivelly connected with the bars 21 and having threaded engagement in a part of the main carriage 1. Such screws or rods 20 are rotatable by hand wheels 22 to raise and lower the rails 19 and with the same the entire installing device.

At its rear end the supplemental carriage 25 which supports the joint installing device rolls upon wheels 23 which rest upon the rails 19. Other wheels 24 carried by the supplemental carriage 25 engage beneath the horizontal upper webs of the rails 19 to hold the supporting wheels 23 in position and against accidental displacement from the rails 19.

The forward end of the supplemental carriage 25 may be supported by the extension pilot 26 having wheels 27 traveling on the rails 19. A preliminary grooving member 28 may be mounted on the extension pilot 26 or upon other parts of the supplemental carriage 25.

The supplemental carriage 25 may be drawn along relatively to the main carriage 15 by a cable 29 affixed to the extension frame 26 and wound about a windlass 30 carried by the main frame 15 at a point forwardly of the rails 19.

Upon the supplemental carriage or frame 25 is a hopper 31 adapted to receive the semi-plastic joint material. The lower end of this hopper communicates with a worm chamber 32 and at its forward end this worm chamber connects with an extrusion tube 33 which extends downwardly and has a reversely returned lower end portion 33^a having a discharge mouth 33^b turned backwardly with reference to the forward movement of the machine and with the reversely returned portion 33^a extending down to a point where the same is adapted to lie in the groove 34 formed by the grooving member 28 in the plastic concrete 35.

A worm or screw conveyor 36 is mounted in the worm chamber with its rear end positioned to receive the semi-plastic joint material from the hopper 31. This worm 36 may be mounted substantially horizontally and the worm chamber 32 may have a substantially horizontal bottom portion preferably rounded transversely to agree substantially with the curvature and diameter of the worm 36. The upper wall of the worm chamber 32 is preferably diagonal although also preferably curved transversely. The upper and lower walls of the worm chamber 32 thus converge toward the extrusion tube 33. This tube 33 is preferably of smaller diameter and capacity than the worm chamber 32. In fact the worm chamber 32 by reason of its convergent walls is of diminishing capacity from the hopper 31 to the extrusion tube 33. The extrusion tube 33 compacts the semi-plastic joint material into desirable cross section which has been selected for the cross section of the joint material 37 laid in the road.

The worm 36 is mounted upon a shaft 38 journaled in appropriate bearings in the supplemental carriage 25 and having a rear sprocket 39 engaged by a chain 40. This chain is also engaged with an upper sprocket 41 on a shaft 42 journaled above and substantially parallel with the

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worm shaft 38 and arranged to be rotated by a hand crank 43. If desired an electric motor or other motor may be substituted for the crank 43 whereby the shaft 42 would be power driven, in which event it might be desirable to change the gear ratio of the chain 40 and its sprockets 39, 41.

A float 44 is suspended beneath the supplemental carriage 25 and over the lower returned end 33^a of the extrusion tube. The suspension means may be in the form of turnbuckles 45 which will permit of vertical adjustment of the float 44. It will be noted that the turnbuckles 45 are pivoted to the carriage 25 and to the float 44. One or more diagonal turnbuckles 46 are pivoted to the frame or supplemental carriage 25 and to the float 44 in order to adjust the float 44 in reference to a forward or backward position on the supplemental carriage and with reference to the discharge mouth 33^b of the extrusion tube.

In the operation of this form of the invention, the concrete 35 has been deposited between the side forms as indicated and has been previously surfaced. The main carriage 1 has been moved over the concrete 35 for the purpose of screeding and surfacing the same. After the main carriage 1 has advanced to a desired position the same is stopped. The supplemental carriage 25 is ordinarily supported at the rear ends of the rails or track 19. This supplemental carriage 25 is now moved forwardly on the rails 19 while the main carriage 1 is halted. The supplemental carriage 25 is moved forwardly relatively to the main carriage by rotating the windlass 30 and winding the cable 29 thereon.

As the supplemental carriage 25 is moving forward, the worm 36 will be rotated by hand or power in such direction as to force the joint material from the hopper 31 and the worm chamber 32 into the extrusion tube 33. Preferably the forward movement of the supplemental carriage 25 and the rotary movement of the worm 36 will be synchronized to the extent that the volume of the extruded material 37 is timed with the forward movement of the depositor 33^b.

The entire installing apparatus may be raised and lowered by recourse to the hand wheels 22 so as to adjust the position of the depositor 33^b in the groove 34 and also the depth of penetration of the preliminary grooving member 28. Such vertical adjustment will also affect the position of the float member 44.

The preliminary grooving member 28 may if desired be constructed integrally with the extrusion tube 33 or it may be otherwise independently mounted. It functions to open the groove in the concrete by separating the coarse aggregate in advance of the depositor 33^b. A preliminary floating member 47 may be secured to the grooving member 28 to minimize the upward heaving of the coarse aggregate during the preliminary grooving operation.

It will be understood that the rails or track members 19 may be of a length of approximately ten feet or more to enable approximately ten feet of the extruded joint material to be inserted in the concrete road at each forward pass of the supplemental carriage 25. After the forward pass of the supplemental carriage 25 on the rails 19 relatively to the main carriage 1, the supplemental carriage 25 is then halted and subsequently the main carriage 1 is moved forward with all the mechanism of the installing device resting in position. In other words the main carriage 1 moves forward, its rails 19 slipping

2,636,425

5-

along wheels 23 and 27, the supplemental carriage 25 being stationary. This movement of the main carriage brings the supplemental carriage 25 again to a rear origin position upon the rails 19. This relative movement of the two carriages is permitted by the easy paying out of the cable 29 from the windlass 30. Thus the main carriage 1 is enabled to advance approximately ten feet ahead, performing its operations of screeding, surfacing, etc. as it moves. The main carriage is then again halted and supplemental carriage 25 moved forward relatively thereto to resume its joint installing operation.

Referring more particularly to Figure 4, it may be important at times to lubricate the walls of the main chute. To accomplish this there is provided a lubricant holding chamber 91 which may be mounted on the main chute or worm tube 92. The lubricant in the chamber 91 is placed under pressure by the piston 93 operated by the hand wheel 94 through the screw shaft 95 turning in the stationary nut 96. By rotating the hand wheel 94 in a proper direction the screw shaft 95 is moved downwardly through the stationary nut 96 which forces the piston or plunger 93 downwardly in the receptacle 91. This action forces the lubricating material through minute perforations in the perforated bottom plate 97 in the bottom of the receptacle 91 which forms a division between the lubricant receptacle 91 and the interior of the worm tube 92. The lubricant in small diameter multitudinous jets will be projected forcibly into the main chute and will lubricate the side walls of the chute so as to reduce the friction of the plastic filler material.

It may be desirable in some cases to project two different kinds of material into the concrete groove. In other words part of the groove may be filled with a semi-plastic material 98, which is forced from the main chute into the bottom part of the concrete groove. A less plastic material 99 is forced from an auxiliary hopper 100 by the screw threaded hand operated pressure screw 101. A narrow tube 102 connects the bottom of the auxiliary hopper 100 with a discharge nozzle 103 arranged adjacent the mouth 104 of the depositor. Lubricant connections 105 are made to the lower portion of the inside walls of the auxiliary hopper 100 and Alemite fittings 106 or other desired fittings are parts of the equipment of the connections 105 to enable lubricant to be forced into the auxiliary hopper 100. Such lubricant will reduce the resistance of the non-plastic material moving through the auxiliary hopper 100 and the tube 102 whereby such material may be more conveniently discharged into the top portion of the groove in the plastic concrete as indicated at 99. The lubricant chamber 91 and auxiliary hopper 100 and associated structure may be mounted on the chute in the modification of Figs. 1 and 2 if so desired, as illustrated in the drawings, and functions identically to the afore-described function of these parts respecting the modification illustrated in Fig. 3.

It will be understood that by using two grades of material, that is the denser or less plastic material at the top of the groove, the same will permit the finishing tools to be operated over this semi-hard material and will also tend to confine the more plastic material in the bottom of the groove during the various operations.

It is also understood that preliminary to the installing of the material the coarse aggregate is separated, as indicated at 107, by use of a grooving tool 108. This grooving tool 108 may

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be operated by hand or otherwise as may be desired. The grooving tool is operated along the rack or track 109 forming part of the carriage, rollers 110 being shown as rolling along said track 109 and carrying the grooving tool 108.

It will also be understood that the entire grooving and installing apparatus is mounted on a movable carriage which spans the plastic surfacing structure. The track 109 may be arranged so it is adjustable up and down as may be required.

While I have disclosed herein the best form of the invention known to me at the present time, I desire it to be understood that I reserve the right to make changes and modifications in the herein described embodiment of the invention provided such changes fall within the scope of the following claims.

What I claim is:

1. An apparatus for installing joint material in concrete surfacing structures comprising a main carriage, tracks suspended adjustably from said main carriage and lying in a horizontal plane, a supplemental carriage supported and movable on said track, a hopper for receiving semi-plastic joint material supported by said supplemental carriage, a worm chamber positioned to receive the joint material from the hopper, an extrusion tube communicating with said worm chamber and having a nozzle portion adapted to extend into the concrete and having a rearwardly directed discharge orifice for depositing the semi-plastic joint material immediately in the concrete, means preceding the nozzle portion for grooving the concrete in advance and in alignment with the nozzle portion, a movable worm in said worm chamber for driving the semi-plastic material from the hopper to the nozzle portion and discharge orifice, a float suspended from the supplemental carriage over the nozzle portion in position to engage the surface of the concrete, and means to adjust said float both vertically and longitudinally of the joint.

2. An apparatus for installing joint material in concrete surfacing structures comprising a carriage, means whereby said carriage may be moved over the concrete structure, a depositor on said carriage adapted to receive semi-plastic joint material and having a nozzle portion for engaging in the plastic concrete and having a rearwardly disposed discharge orifice for discharging the joint material directly and immediately in the concrete, means to force with great pressure the semi-plastic joint material through said depositor, a lubricant reservoir, a follower plunger movably mounted in the reservoir, screw means to exert great pressure on said follower plunger, and a perforated wall between said lubricant reservoir and the interior of the depositor for dividing the lubricant into numerous small diameter portions as the same is admitted to the depositor.

3. An apparatus for installing joint material in concrete surface structures as claimed in claim 1 characterized by the fact that said last named means comprises turn buckles connected between said supplemental carriage and both the end and rear portions of said float.

4. An apparatus for installing joint material in concrete surface structures as claimed in claim 1 characterized by the fact that said last named means comprises side turn buckles coupled to said supplemental carriage and to the end portions of said float, and rear turn buckles extending di-

2,036,425

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agonally between the rear portion of said float and said supplemental carriage.

5. An apparatus for installing joint material in concrete surface structures as claimed in claim 2 further comprising a container for a less plastic material, means for forcing the less plastic material from said container, and a nozzle leading from said container to the rear of the first mentioned nozzle portion whereby to deposit the less plastic material on top of the semi-plastic material being extruded from said nozzle portion.

6. An apparatus for installing joint material in concrete surfacing structures comprising a main carriage, tracks suspended adjustably from said main carriage, a supplemental carriage movably mounted on said tracks, a hopper for receiving semi-plastic joint material supported by said supplemental carriage, a worm chamber positioned to receive the joint material from the hopper, an extrusion tube communicating with said worm chamber and having a nozzle portion adapted to extend into the concrete and having a discharge orifice for depositing the semi-plastic joint material immediately in the concrete, means

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preceding the nozzle portion for grooving the concrete in advance and in alignment with the nozzle portion, a movable worm in said worm chamber for driving the semi-plastic material from the hopper to the nozzle portion and discharge orifice, a float suspended from the supplemental carriage over the nozzle portion and positioned to engage the surface of the concrete, and means to adjust said float both vertically and longitudinally of the joint, and means for lubricating the interior of the nozzle.

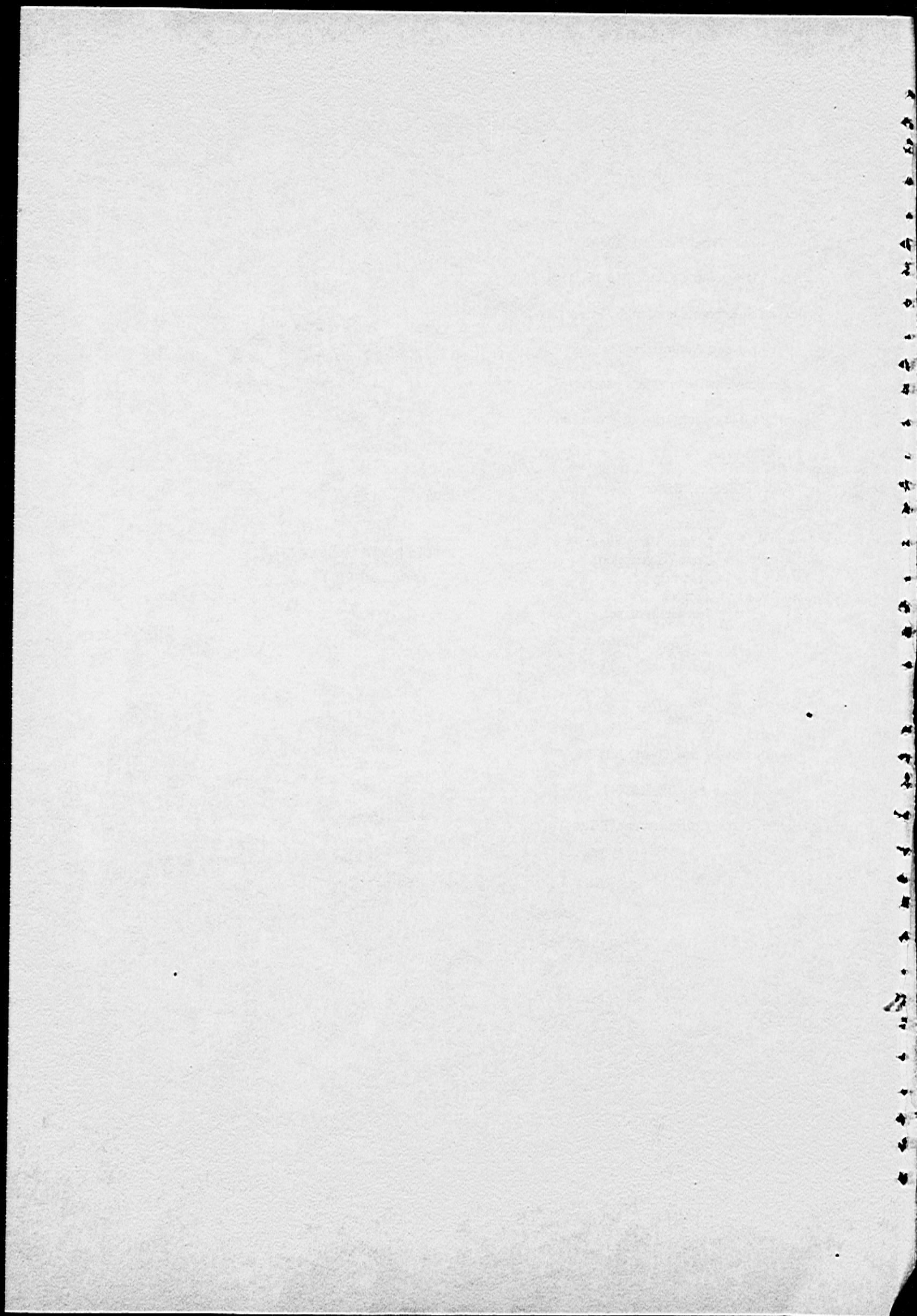
JOHN N. HELTZEL.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,053,645	Reimer	Feb. 12, 1913
1,828,738	Hood	Oct. 27, 1931
1,829,479	Elkins	Oct. 27, 1931
1,946,972	Heltzel	Feb. 13, 1934
1,982,387	Heltzel	Nov. 27, 1934
2,013,407	Gibbs	Sept. 3, 1935
2,035,627	West	Mar. 31, 1936





DEFENDANT'S EX. #1
(Cont'd.)

Paper No. 18

[Mailed Apr. 28, 1958
U.S. Patent Office
Board of Appeals]

Appeal No. 21-35
Hearing:
February 24, 1958

IN THE UNITED STATES PATENT OFFICE

BEFORE THE BOARD OF APPEALS

Ex parte Charles P. Gross

Application for Patent filed December 17, 1952.
Serial No. 326,471. Joint Filling Machine.

A. Yates Dowell and A. Yates Dowell, Jr. for appellant.

Before McCann and Dracopoulos, Examiners-in-Chief, and Patrick,
Acting Examiner-in-Chief.

Dracopoulos, Examiner-in-Chief.

This is an appeal from the final rejection of claims 1, 4, 5 and 10, and from the examiner's refusal to allow claims 14, 15, 16 and 18 which were added by an amendment filed on even date with the notice of appeal, and entered by the examiner.

Claims 1, 10 and 14 are reproduced as illustrative:

1. A machine for cleaning and filling joints comprising a frame, ground-engaging supporting wheels for movably supporting said frame on a surface, power means on said frame, a vertically

adjustable bracket projecting from said frame and having a substantially horizontal bearing, a shaft rotatably mounted in said bearing, a cutter mounted on said shaft, a vertically adjustable pilot gouge mounted on said bracket, arm means projecting rearwardly from said bracket, a nozzle pivotally connected to the rear end of said arm means and projecting downwardly therefrom, a ground-engaging plate extending rearwardly from said nozzle and having a downwardly projecting rib in alignment with said nozzle on the lower side of said plate, a rotatable brush mounted in a bearing of said arm means, means connecting said cutter and said brush to said power source for operating the cutter and brush in a direction to feed the machine forwardly, and means for supplying joint filling material under pressure to said nozzle whereby the machine will excavate the joint to uniform dimensions and fill the same in a manner that substantially all of the filling material will be below the upper portion of the joint.

10. Means for filling a joint comprising a plate having a rib projecting from one side thereof, a nozzle projecting from the same side of the plate and in substantial alignment with said rib, said nozzle having a discharge portion opening downwardly and rearwardly in the direction of said rib and closed at the front and sides, the said nozzle being of a width to extend into a joint to be filled and accommodating the plastic material under pressure whereby the said nozzle and plate may be moved together for filling a joint and said rib serving to limit the height of the filling material in the joint.

14. Apparatus for forcibly filling joints in pavement with a highly viscous filler, said apparatus comprising a tube having one end terminating in spaced side walls with exterior side surfaces spaced apart less than the spacing of the walls of the joint between

which the device is to be inserted for filling, and with the internal surfaces of such walls providing at the end of the tube an elongated depending discharge passage opening downwardly and rearwardly and closed at the front and sides thereof, whereby the highly viscous filler can be forcibly discharged through said passage downwardly into the joint to be filled and upon the filling of the joint at the point of such downward discharge, force exerted upon the filler will be transmitted to the closed front portion of the discharge end of the tube and facilitate forward motion of the apparatus during the filling of a joint.

The references relied upon are:

Heltzel	1, 946, 972	Feb. 13, 1934
Fischer	2, 354, 586	July 25, 1944
Lewis	2, 569, 682	Oct. 2, 1951
Heltzel	2, 636, 425	Apr. 28, 1953
Coates	2, 673, 725	Mar. 30, 1954
Klicpera	2, 701, 134	Feb. 1, 1955

The asserted invention relates to the filling of expansion joints in concrete pavements and more particularly to an apparatus for cutting a groove at the joint, cleaning the groove, and the filling the groove with joint material under pressure in a continuous operation as the apparatus is moved over the joint. As shown in Figs. 1 and 5, the cutting and cleaning are effected by a power driven rotary cutter 43 and a power driven rotary brush 56, and the filling by a nozzle 63 which is connected to a filling-material hopper 27 via a pump 23. The nozzle has a rear discharge opening 80 and a notch 81 at the bottom of its front wall and is supported by a plate 66 which rides the pavement and is provided with a central shallow rib 79 in line with the nozzle, serving to extend into the groove to depress and finish the upper surface of the joint. As described in the paragraph bridging pages 11 and 12 of appellant's brief -

"The positive feeding of the joint filling material through the nozzle causes the groove 93 to be filled from the bottom upwardly and when the groove is filled the confined filling material in the groove will act as an abutment and the reaction of the freshly added filling material will tend to push against the front wall causing some filling material to ooze through the small notch 81 in the front wall, and upon observation of this oozing the operator knows that the nozzle should be moved forward regardless of whether the nozzle is supported on a wand held in the hand or supported on the arm 54, bracket 69 and strut 68. The reaction against the front wall of the nozzle causes the nozzle to be automatically fed forwardly."

For a more detailed description of the claimed apparatus, reference is made to pages 8-11 of appellant's brief.

The examiner has rejected claims 1, 4 and 5 as being aggregative, it being his position that there is no patentable cooperation between the groove forming means and the groove filling means. He asserts that other groove forming devices could be used with the specific groove filler and vice versa and that the total result is the sum of those produced by the separate parts and that, moreover, the groove could in fact be formed during the molding process and later filled after the concrete is set and hence the specific carrying means is not necessary to the specific nozzle.

Appellant submits that a true combination does exist in the claimed elements, on the basis that all of the elements cooperate with each other to the common end of obtaining a water tight joint and are all mounted upon a vehicle.

We have carefully read claims 1, 4 and 5 and while we agree with the examiner that the individual units included therein are capable of existing and functioning individually, we cannot agree with his view that in the recited correlation they constitute a mere aggregation. Clearly the

arrangement and mounting of the elements or units provide for correlated successive operations which mutually contribute to a single purpose, namely, the formation of a complete expansion joint. The fact that either unit could have a somewhat different structural form does not in our opinion justify the holding of aggregation, since the same coordination between the units would obviously exist. Accordingly, the instant ground of rejection will not be sustained and patentability of the claims must be weighed with reference to the prior art. In re Worrest, 40 CCPA 804; 1953 CD 118 (pgs. 124-125); 669 OG 944; 201 F. (2d) 930; 96 USPQ 381. In re Williams and McCabe, 1933 C.D. 82, 426 OG 785; 62 F. (2d) 86, Ex parte Noling, 50 USPQ 31.

Claims 10, 14, 15 and 16 stand rejected as unpatentable over either Heltzel patent. The examiner, while recognizing that neither of these patents discloses an opening at the bottom of the nozzle, sees no patentable advantage in eliminating the bottom wall thereof, if desired, and disagrees with the appellant that the Heltzel nozzles will not fill the bottom of the joint space. As to the levelling rib recited in claims 10 and 16, it is the examiner's view that the use of such a rib merely reflects ordinary choice and judgment of the skilled mechanic and, hence, does not present a patentable contribution to the art.

Appellant contends, in substance, that the rearwardly extending nozzles of the Heltzel patents are incapable of filling the lower portion of a joint, although he admits that in plastic concrete with which the Heltzel devices are used the results may be satisfactory since the plastic concrete would probably refill the lower portion of the joint or groove. With respect to the rib, appellant points out that neither reference discloses it and that in Heltzel (No. 1,946,972) there is no structure to which such a rib could be attached since the plate therein does not extend rearwardly of the nozzle.

We agree with the examiner that claims 14, 15 and 16 do not distinguish patentably over Fig. 24 of Heltzel (No. 1,946,972). Nozzle

36t, which extends downwardly from flanges 37t, is open rearwardly and closed at the front and sides and will inherently function, when filler under pressure is discharged therefrom, to facilitate forward motion of the apparatus as called for in these claims. We see nothing unobvious resulting from making the bottom of the nozzle open. The downwardly projecting surface portion added in the pending claim 16 is also not shown in the reference. However, as broadly set forth in the claim, it need not produce appellant's intended function and, in fact, any useful purpose. For example, said portion as recited could be extending from a rearwardly extending surface near the bottom of the discharge passage. Accordingly, the rejection of claims 14, 15 and 16 will be sustained.

We cannot agree with the examiner, however, with respect to claim 10 which defined the rib and the nozzle as projecting from one side of the plate and positions the rib rearwardly in alignment with the rear opening of the nozzle, thereby serving to limit the height of the filling material in the joint groove. Neither patent to Heltzel discloses a rib, much less the claimed relation thereof with the nozzle. On the basis of the Heltzel patents, the rejection of claim 10 will not be sustained.

Claim 18 stands rejected as unpatentable over either of the Heltzel patents, as above applied to claims 10, 14, 15 and 16, it being the examiner's position that the joint cleaning means added in claim 18 could precede the filling operation without the exercise of invention.

Appellant's basic contention as to claim 18 is that Heltzel does not show power means for obtaining high pressure of the filling material.

We are not impressed with appellant's foregoing contention, it being our opinion that the degree of the pressure applied is a matter within the skill of the routine workman in the art, obviously governed by the viscosity of the filler used. As to the recitation in claim 18 of "joint cleaning means carried by said vehicle", we see nothing inventive or unobvious in providing the Heltzel apparatus with cleaning means broadly. Such means may take the form of a blower, for example, for blowing any

dust accumulation at the top of the finished or filled joint and, surely, the addition of a fan for that purpose would hardly merit patent protection. In the light of the foregoing, the rejection of claim 18 will be sustained.

Claims 1, 4 and 5 were further rejected as unpatentable over Heltzel, as applied to claim 10, further in view of Klicpera, Coates, Lewis and Fischer. Klicpera, Coates and Lewis disclose a wheeled vehicle carrying power operated concrete rotary cutters, while Fischer shows a vehicle carrying rotary brushes for cleaning crevices or joints in concrete pavements. It is the examiner's stated position -

"It would not involve invention to precede the Heltzel nozzles with cutters of the type shown by Klicpera, Coates, or Lewis. To follow with a rotary brush does not patentably differentiate as substantiated by Fischer. It would be obvious to use a gouging means. No patentable significance can be attributed to applicant's mounting means. Applicant objects to the number of references. Where applicant's device is an aggregation of expedients old in the art no inventive contribution is involved, *In re Dove* 622 OG 636. Selecting desirable features from the prior art and uniting in a single device, to obtain their aggregative result is not invention, see *ex parte Fine* 1927 CD 84."

It is argued by the appellant -

"Just how these features of the various patents could be combined within the teaching of these various patents is not understood and it is therefore submitted that the claims should be allowable. It is also submitted that the proposed construction would be inoperative since the use of a rotary brush of Fischer on the plastic concrete of Heltzel would result in such disturbance of the plastic concrete adjacent the joint as to make an extremely erratic and irregular groove and the groove could not be filled with the Heltzel nozzles. It will further be noted that the Heltzel nozzles open to

Decision of Board of Appeals

the rear only and do not open toward the bottom and, therefore, the Heltzel nozzles could not fill the joint from the bottom up."

We have reviewed the reference disclosures in the light of the respective positions of the examiner and the appellant without finding any suggestion therein of their proposed combination so as to arrive at appellant's claimed apparatus. Both of the primary references to Heltzel are concerned with the formation of a joint in plastic concrete, and there would be no reason of providing either Heltzel apparatus with a rotary cutter and a rotary brush. It seems to us that the teaching for the proposed combination must have stemmed from appellant's own disclosure. Moreover, as the appellant has correctly pointed out, the presence of a rotary brush in Heltzel would have a detrimental effect on the joint in view of the plastic condition of the concrete. In view of the foregoing, including our holding that the claims are not aggregative, we will not sustain this ground of rejection of claims 1, 4 and 5.

The decision of the examiner is affirmed as to claims 14, 15, 16 and 18, and is reversed as to claims 1, 4, 5 and 10.

L. P. McCann	)	
Examiner-in-Chief	)	
	)	
P. T. Dracopoulos	)	BOARD
Examiner-in-Chief	)	OF
	)	APPEALS
	)	
P. L. Patrick	)	
Examiner-in-Chief	)	
(Acting)	)	

April 28, 1958

DEFENDANT'S EXHIBIT #1
(Cont'd.)

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Examiner's Answer

[Mailed Aug. 21, 1956
Pat. Div. 33]

Paper No. 15

DEPARTMENT OF COMMERCE
United States Patent Office
Washington

In re application of
Charles P. Gross

Ser. No. 326,471)
Filed December 17, 1952)
For JOINT FILLING MACHINE)

Appeal No. 21-35

Before the Board of Appeals

A. Yates Dowell and A. Yates Dowell, Jr.
for Appellant,

EXAMINER'S ANSWER

This is an appeal from the refusal of the Primary Examiner to allow finally rejected claims 1, 4, 5, 10 and claims 14, 15, 16, and 18 added by amendment of April 30, 1956 for purposes of appeal.

A correct copy of the appealed claims appears on pages 2-6 of applicant's brief except for the omission of the word "and" after "front" in line 6 of claim 10. The omission has been corrected. Also claim 16 has been additionally amended in paper No. 14 so that the last line reads "with a downwardly projecting surface portion". The copy of claim 16 in the brief should be changed accordingly.

The references relied upon are:

Heltzel	1,946,972	Feb. 13, 1934
Heltzel	2,636,425	Apr. 28, 1953
Fischer	2,354,586	July 25, 1944
Lewis	2,569,682	Oct. 2, 1951
Coates	2,673,725	Mar. 30, 1954
Klicpera	2,701,134	Feb. 1, 1955
	(filed	Jan. 9, 1950)

Examiner's Answer

An adequate explanation of the alleged invention appears on pages 7-11 of applicant's brief.

Essentially applicant cuts and cleans a groove in a paved surface by the instrumentalities shown at 50', 43 and 56 of Fig. 1. He then injects a filler material 63 which extends below plate 66. It will be noted that plate 66 bridges the groove, and nozzle 63 has a rear discharge opening to fill the joint as the apparatus moves forwardly. Obviously, the materials being under pressure will exert a degree of forward reaction on the front of the nozzle as the materials are ejected from the rear opening.

The grounds for rejection as stated in the final rejection of claims 1, 4, 5, and 10 are relied upon.

Claims 1, 4, and 5 include the means for forming the groove plus the means for filling the groove with joint material. These claims are considered to be aggregational for reasons stated in the final rejection. Devices for cutting grooves and channels in a hardened pavement are in class 262 as shown by the patents to Lewis, Coates, and Klicpera. The Heltzel patents in class 94 show apparatus for grooving a pavement, while still plastic, and filling with a joint material. Other types of cutters can be used to form the groove for the specific nozzle recited. In fact the groove can be formed during the molding process and later filled after the concrete has set. The specific cutting means is not necessary to the specific nozzle.

Claims 1, 4, and 5 have also been rejected on art for reasons stated in the last paragraph of the final rejection.

Claims 10, 14, 15, and 16 recite the nozzle per se and claim 18 additionally recites joint cleaning means. The references and reasons cited against claim 10 in the final rejection are relied upon. It will be noted that Heltzel 1,946,972 in Figs. 6, 20 and 24 shows a nozzle with a rearwardly directed opening below a bridging plate. The materials are injected under pressure and will obviously exert a forward reaction force

Examiner's Answer

opposite the rear discharge opening. The amount of pressure is a matter of degree. Obviously a joint cleaning means could precede the filling operation without the exercise of invention.

Heltzel 2, 636, 425 also shows a rear discharge in Fig. 2. For all practical purposes plate 44 of Heltzel could be made integral with the nozzle if so desired.

Claim 10 additionally recites a rib 79 behind the nozzle (Fig. 3). This rib merely levels the filler materials below the top of the groove or cut. It is contended that such use of a leveling rib reflects ordinary choice and judgement of the skilled mechanic and is not considered to be a patentable contribution to the art. The downwardly projecting portion in claim 16 reads on the rib 79 in Fig. 3 and is also for the purpose of lowering the top level of the injected materials.

Applicant argues that the Heltzel nozzles may be closed at the front and sides and open at the rear as recited, but that they are not open at the bottom. No patentable advantage can be seen in eliminating the bottom wall of any of the Heltzel nozzles if so desired. The Heltzel nozzles will also fill the bottom of the joint space.

The type of joint material and the degree of pressure used are considered to be immaterial to the recited apparatus.

Respectfully submitted,

Examiner, Division 33

JLNackenoff:ew

[Filed July 12, 1960]

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

CHARLES P. GROSS,	:	
	:	
Plaintiff,	:	
v.	:	Civil Action No. 1681-58
	:	
ROBERT C. WATSON,	:	
	:	
Defendant.	:	

MEMORANDUM

Judgment for the defendant.

It is well settled that an improvement which is merely of a mechanical character does not rise to the dignity of invention. Smith v. Kingsland, 178 F. 2d 26, 29.

Counsel will prepare tentative findings of fact and conclusions of law and judgment, at once.

/s/ Matthew F. McGuire
MATTHEW F. MCGUIRE
United States District Judge

July 12, 1960

[Filed October 12, 1960]

FINDINGS OF FACT

1. Charles P. Gross brought this action under 35 U.S.C. 145 to authorize the Commissioner of Patents to issue letters patent to him containing claims 14, 15, 16 and 18 of his application entitled "Joint Filling Machine," Serial No. 326,471, filed December 17, 1952. Claims 1, 4, 5 and 10, the other claims in this application, were held allowable by the Board of Appeals of the Patent Office.

2. The Gross application relates to the filling of joints in concrete pavements, and more particularly to an apparatus for cutting material in

the groove at a joint, cleaning the groove, and then filling the groove with filler material under pressure. The elements for cutting, cleaning and filling may be mounted in longitudinal alignment on a movable frame so as to perform the operations continuously in the order named as the frame is moved along a groove. The filling element may include a plate for engaging the top surface of the pavement at the sides of the groove and also a nozzle extending through the plate to approximately the depth of the groove to be filled. The nozzle has an opening at the rear and bottom for extrusion of filler material under pressure. The plate may have a longitudinal rib adapted to extend into the groove between the sections of pavement.

3. Heltzel patent No. 1,945,972 relates to apparatus for making filled joints in plastic concrete before solidification. This apparatus includes a nozzle for extruding filler material under pressure and a member adapted to be moved through concrete, which has not yet hardened, in advance of the nozzle for the purpose of clearing stones from the portion of the concrete in which the filled joint is to be formed. The patent discloses nozzles of several forms, each of which has an opening to the rear for extrusion of filler material under pressure as the nozzle moves through the concrete. One such nozzle, shown in Figure 24 at 36t, includes a plate 37t disposed above the nozzle opening, which plate is adapted to slide over the surface of the plastic concrete. Another nozzle of this general type is shown at 36' in Figure 7.

4. Heltzel patent No. 2,636,425 relates to joint forming and filling apparatus described as an improvement over that disclosed in certain prior patents including Heltzel No. 1,946,972. The apparatus of Patent No. 2,636,425 is adopted for applying filler materials which are semi-plastic and "resist flow" and require "comparatively great pressure" to project them into the concrete. The apparatus includes means capable of imposing "enormous pressure" on the filler material to "drive" it "forcibly into the prepared groove in the concrete." A dispenser for the material is shown in Figure 2 as including a nozzle which extends below float members or plates 44 and 47 and has a rearwardly disposed dis-

charge opening 33b. Another nozzle for this purpose, shown in Figure 4, has a dispensing opening which is directed both rearwardly and downwardly.

5. Conformably with the holding of the Board of Appeals, it would be obvious to a person of ordinary skill in the art to make the nozzle shown in Figure 24 of Heltzel patent No. 1,946,972 open at the bottom.

6. It would be obvious to a person of ordinary skill in the art to make the nozzle shown in Figure 7 of Heltzel patent No. 1,946,972 open at the bottom.

7. It would be obvious to a person of ordinary skill in the art to make the nozzle shown in Figure 2 of Heltzel patent No. 2,636,425 open at the bottom.

8. The nozzle construction of Figure 4 of Heltzel patent No. 2,636,425, with its open portion at the bottom as well as at the rear, would suggest to a person of ordinary skill in the art that openings be provided in the bottoms of other forms of nozzle shown in the two Heltzel patents, including, particularly, the nozzles shown in Figures 24 and 7 of patent No. 1,946,972 and the nozzle shown in Figure 2 of Patent No. 2,635,425.

9. Conformably with the holding of the Board of Appeals, the recitation in claim 16 of "a surface extending from the tube at the rear of the discharge passage with a downwardly projecting surface portion" does not set forth the relationships which are necessary in order to adapt said "downwardly projecting surface portion" for limiting the height of the filling material in the joint groove. This "downwardly projecting surface portion", as recited, could project from a rearwardly extending surface near the bottom of the discharge passage where it would not engage the upper surface of the filler material extruded from the bottom of the nozzle.

10. Conformably with the holding of the Board of Appeals, the limitation which claim 16 adds to the subject matter defined in claim 14, on which claim 16 depends, does not define anything of patentable significance.

11. Conformably with the holding of the Board of Appeals, it would be obvious to a person of ordinary skill in the art to provide the apparatus of Heltzel patents Nos. 1, 945, 972 and 2, 636, 425 with cleaning means, such, for example, as a blower for blowing away any dust accumulation at the top of the filled joint.

12. Claims 14, 15, 16 and 18 are unpatentable over Heltzel patent No. 1, 946, 972.

13. Claims 14, 15, 16 and 18 are unpatentable over Heltzel patent No. 2, 636, 425.

14. Claims 14, 15, 16 and 18 are unpatentable over Heltzel patent No. 1, 946, 972 in view of Heltzel patent No. 2, 636, 425.

CONCLUSIONS OF LAW

1. Patentable invention does not arise where the changes in the prior art involve only the exercise of ordinary mechanical skill.

2. Plaintiff is not entitled to a patent containing any of claims 14, 15, 16 and 18.

3. The complaint should be dismissed as to all the claims in suit.

/s/ Matthew F. McGuire
Judge

October 12, 1960
(N)

[Filed July 20, 1960]

JUDGMENT

This action came on to be heard at the last term and thereupon, upon consideration thereof, it is this 20th day of July, 1960.

ADJUDGED that the complaint be and it is hereby dismissed, with costs against plaintiff.

/s/ Mathew F. McGuire
Judge

[Filed September 16, 1960]

NOTICE OF APPEAL

Notice is hereby given this 16th day of September, 1960, that Plaintiff, Charles P. Gross hereby appeals to the United States Court of Appeals for the District of Columbia from the judgment of this Court entered on the 20th day of July, 1960 in favor of Defendant, Robert C. Watson against said Plaintiff.

/s/ A. Yates Dowell, Jr.

A. YATES DOWELL

A. YATES DOWELL, JR.

1345 Pennsylvania Ave., N. W.

Washington 4, D. C.

Attorneys for Plaintiff

* * *



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BRIEF FOR APPELLEE

United States Court of Appeals
FOR THE DISTRICT OF COLUMBIA CIRCUIT

Appeal No. 16,047

CHARLES P. GROSS, APPELLANT,

v.

ROBERT C. WATSON, COMMISSIONER OF PATENTS,
APPELLEE

Appeal from the Judgment of the United States
District Court for the District of Columbia

CLARENCE W. MOORE,
*Solicitor, United States Patent Office,
Attorney for Appellee.*

DAVID KREIDER,
Of Counsel.

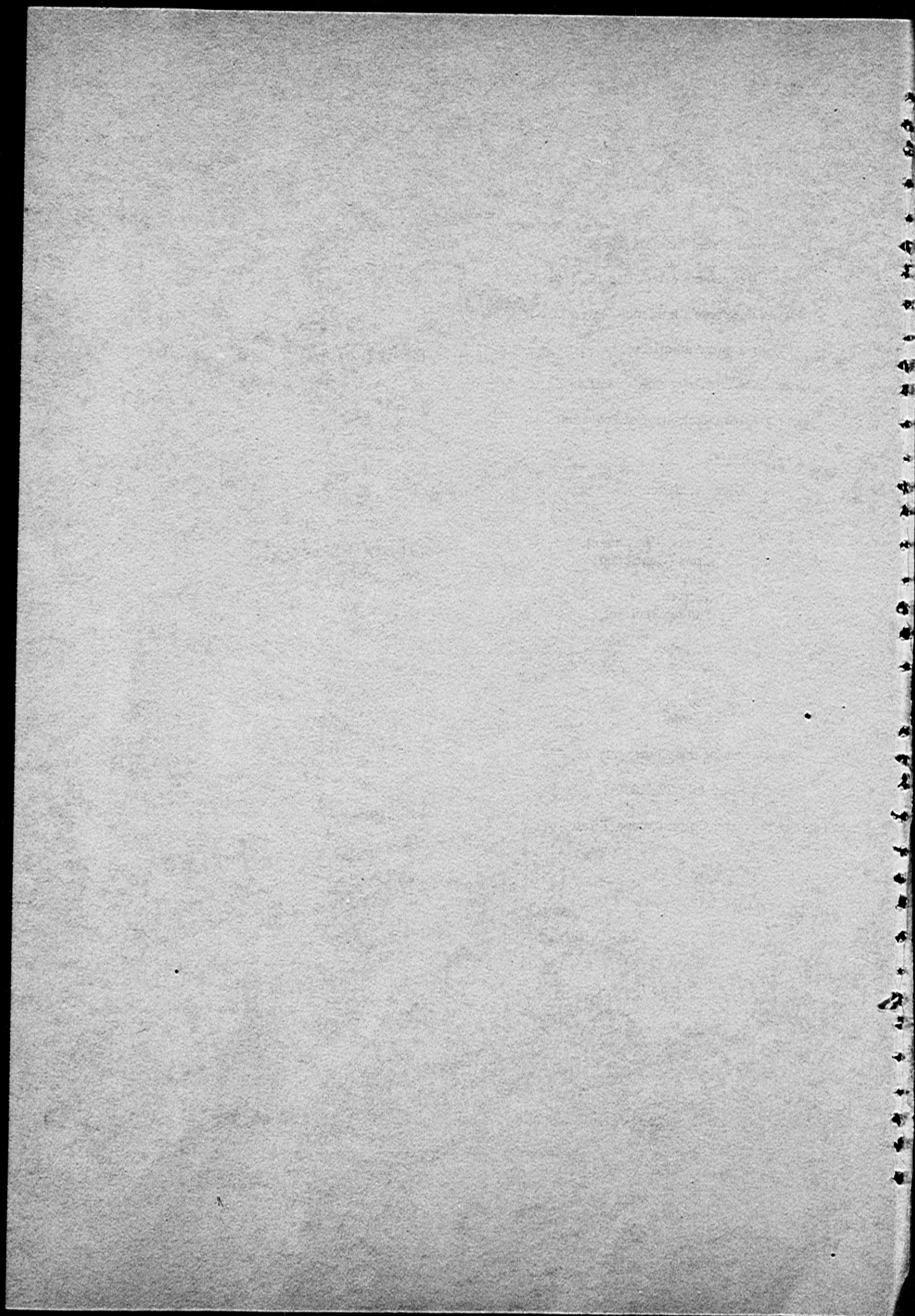
United States Court of Appeals
For the
District of Columbia Circuit

FILED

JAN 17 1961

Joseph W. Stewart

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Appeal No. 16,047**STATEMENT OF QUESTION PRESENTED**

In the opinion of appellee, the question presented is:

Whether the District Court was clearly wrong in holding that it would have been obvious to a person of ordinary skill in the art to make the nozzles of the apparatus of Figures 24 and 7 of Heltzel patent No. 1,946,972 and Figure 2 of Heltzel patent No. 2,636,425 open at the bottom and that claims 14, 15, 16, and 18, do not define patentably over such apparatus when so modified?

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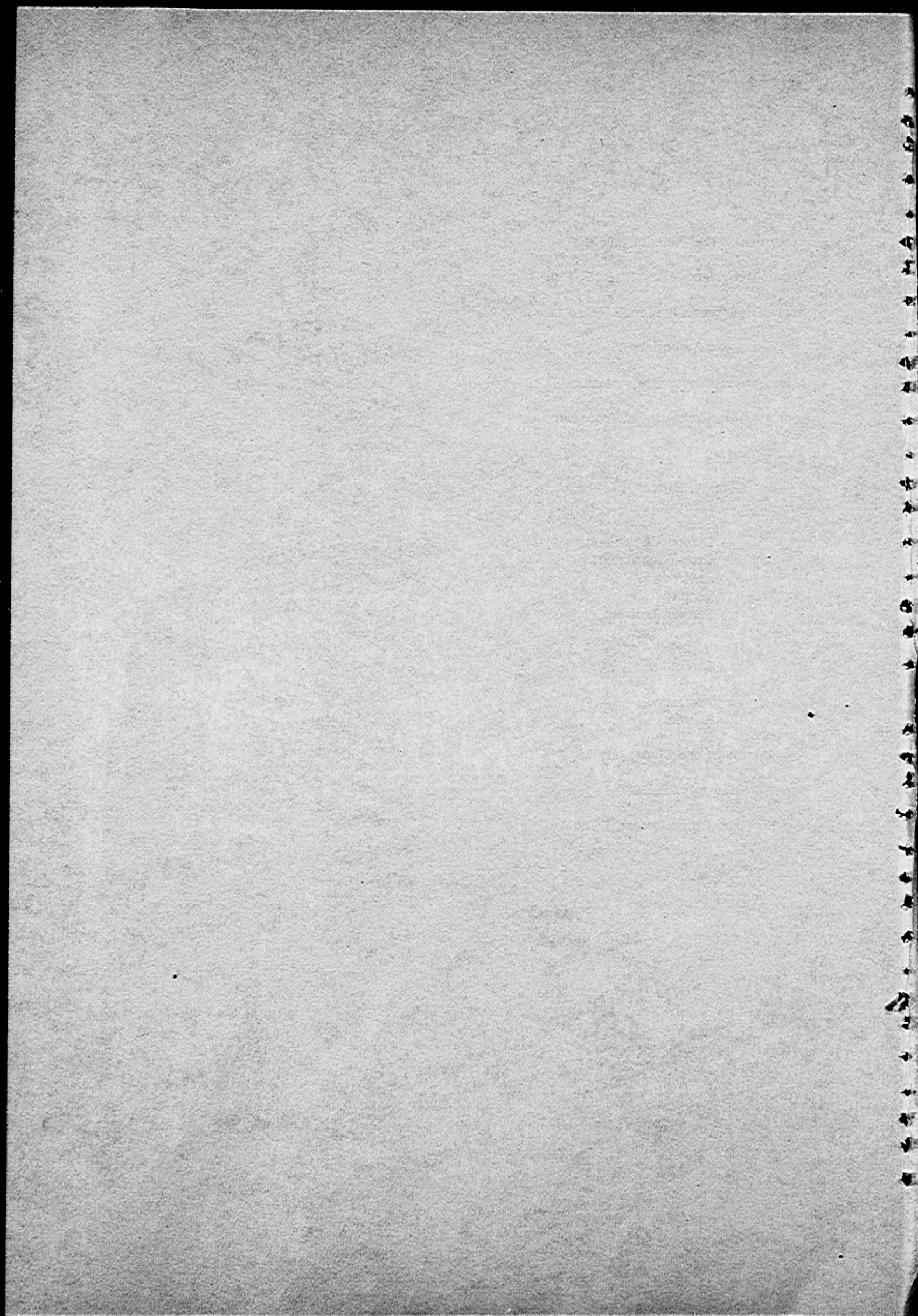
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United States Court of Appeals
FOR THE DISTRICT OF COLUMBIA CIRCUIT

Appeal No. 16,047

CHARLES P. GROSS, APPELLANT,

v.

**ROBERT C. WATSON, COMMISSIONER OF PATENTS,
APPELLEE**

**Appeal from the Judgment of the United States
District Court for the District of Columbia**

BRIEF FOR APPELLEE

INTRODUCTION

The appellant here seeks review of a judgment of the United States District Court for the District of Columbia (J.A. 97) dismissing the complaint (J.A. 2-5) in an action under Section 145 of Title 35 of the United States Code (Act of July 19, 1952, c. 950; 66 Stat. 803). In the action, Charles P. Gross, the appellant, sought to have the Court authorize the

issuance of a patent on Gross application, Serial No. 326,471, filed December 17, 1952, including claims 14, 15, 16, and 18 (J.A. 49-50) therein, other claims having been allowed by the Patent Office (J.A. 94). These disallowed claims were refused by the Patent Office, and this refusal was approved by the District Court, for the reason that they failed to define patentable subject matter or invention over certain prior art patents.

COUNTER-STATEMENT OF THE CASE

The "Statement of the Case" beginning on page 2 of the appellant's brief is regarded by appellee as incomplete and as including argumentative matter. Therefore a counter-statement of the essential facts is deemed necessary.

Appellant's Application

The application here involved discloses an apparatus for filling expansion joints in concrete surfaces. The disclosed apparatus may be employed for cutting a groove at the joint, cleaning the groove, and filling the groove with filler material under pressure in a continuous operation as the apparatus is moved over the joint. From reference to Figures 1, 2 and 3 of Plaintiff's Exhibit No. 2 (J.A. 52), which are more legible copies of Figures 1, 2 and 3, respectively, of appellant's application drawing (J.A. 33, 34), it will be apparent that the means for performing these operations may be mounted on a wheeled vehicle. The means are disposed in longitudinal alignment on the vehicle as follows: gauge 50' for removing old

filler material from a joint to be excavated and filled, a rotary cutter 43 having cutting teeth 44, rotatable brushes 56 and 57, and a nozzle 63 which has a plate 66 secured thereto. As indicated in Figure 2, the nozzle may be operated manually by means of a handle 83 instead of being carried by the vehicle as shown in Figure 1.

The details of a first form of nozzle are shown in Figures 2 and 3 (J.A. 34 and 52). The lower end of this nozzle, which is adapted to be inserted into the joint to be filled, is shown at 63 as being open at the bottom and the rear. Plate 66 is secured to the nozzle just above the open portion 63 so that this plate can be maintained in engagement with the upper surfaces of the pavement at the sides of the joint. A rib 79 projects downwardly from the lower surface of the plate 66 to the rear of the nozzle 63 so as to extend partially into the joint and thus limit the height to which the filler material is disposed in the joint. Other forms of nozzles are shown in Figures 5, 6 and 7 (J.A. 34).

The Allowed Claims

Claims 1, 4 and 5 (J.A. 48-49), which stand allowed, relate to the combination of the cutter, brush and nozzle, either with a vehicle or as an attachment for a vehicle. Claim 10 (J.A. 49), which also stands allowed, defines the filling means or applicator with its discharge nozzle extending downwardly from the positioning plate and the rib on the underside of the plate to the rear of the nozzle for limiting the height to which filler material is inserted.

The Claims In Issue

Claims 14, 15 and 16 (J.A. 49-50) define only the filling means or applicator, and the construction is set forth more broadly than in allowed claim 10. Claim 18 (J.A. 50) defines the broad combination of "cleaning means" and an applicator with a vehicle.

Heltzel Patent No. 1,946,972

Heltzel patent No. 1,946,972 (J.A. 54-71) relates to apparatus for making filled joints in concrete before the concrete has solidified. The apparatus includes a nozzle for extruding filler material under pressure and a member adapted to be moved through unhardened concrete in advance of the nozzle for the purpose of clearing stones or the like from the portion of the concrete in which the filled joint is to be formed. The patent discloses nozzles of several forms, each of which has an opening to the rear for extrusion of filler material under pressure as the nozzle moves through the concrete. One such nozzle, shown in Figure 24 (J.A. 61), includes a plate 37t disposed over the nozzle end, which plate is adapted to slide over the surface of the plastic concrete. Another nozzle of this general type is shown at 36' in Figure 7 (J.A. 59).

Heltzel Patent No. 2,636,425

Heltzel Patent No. 2,636,425 (J.A. 73-82) relates to joint forming and filling apparatus described (J.A. 79) as an improvement over that disclosed in certain prior patents including Heltzel patent No. 1,946,972. The apparatus of the later improvement

of the patent is described as adapted for applying filler materials which are semi-plastic and "resist flow" and "require comparatively great pressure" to project them into place in the concrete (J.A. 79, column 1, lines 29-46). The apparatus includes means capable of imposing "enormous pressure" on the filler material to "drive" it "forcibly into the prepared groove in the concrete." An applicator or dispenser for the filler material is shown in Figure 2 (J.A. 75) as including a nozzle which extends below float members or plates 44 and 47 and has a rearwardly disposed discharge opening 33 b. Another nozzle for this purpose, shown in Figure 4 (J.A. 77), has a dispensing opening which is directed both rearwardly and downwardly.

SUMMARY OF ARGUMENT

Appellant has the burden of showing that the findings of the District Court with respect to obviousness and non-patentability are clearly erroneous. Although the tribunals below found the claims in issue unpatentable on the basis of each of three prior art nozzle constructions, it is suggested that affirmance by this Court is in order upon the finding of unpatentability on the basis of any one of these three constructions being found by it to be free of clear error.

The nature of the filler material to be employed is not of significance here because the claims are all directed to the dispensing apparatus only and because Heltzel patent No. 2,636,425 makes a full and complete disclosure of the use of high viscosity filler material.

Claims 14, 15, 16 and 18, in issue here, are unpatentable under the provisions of 35 U.S.C. 103, set out in appellant's brief (Br. 10), on the basis of the prior art as represented by Heltzel patent Nos. 1,946,972 and 2,636,425. No error has been shown in the District Court's holdings that the differences are only those of mechanical character, without invention (J.A. 94), and that it would be obvious to provide an open bottom in the nozzles of Figures 24 and 7 of No. 1,946,972 (Findings of Fact Nos. 5 and 6—J.A. 96) and in Figure 2 of No. 2,636,425 (Finding of Fact No. 7—J.A.-96). The recitation in claim 16 of a surface extending from the tube and having a downwardly projecting portion does not relate the "surface" and the surface "portion" to the tube or nozzle in such manner that the "portion" will provide appellant's intended function or any useful function. Since claim 10 recites relationships causing the rib to limit the height of filler material being placed in a joint and claims 14, 15, 16 and 18 omit either the rib or the operative relationship necessary to result in the rib providing a useful function, the refusal of the District Court and Board of Appeals to hold claims 14, 15, 16 and 18 to be patentable is not in any way inconsistent with the allowance of more specific claim 10.

Evidence that appellant's apparatus has been used successfully is not of any significance here since claims 14, 15, 16 and 18 are clearly unpatentable over the prior art. Also, any successful use of appellant's apparatus may have been due to features already granted recognition by the allowance of claims 1, 4, 5 and 10.

ARGUMENT

The burden of proof which the appellant must meet in order to prevail in this appeal is discussed in *Abbott et al. v. Coe*, 71 App. D. C. 195, 109 F.2d 449, wherein it is stated:

"Although a court, when it agrees with a Patent Office finding, often says so, agreement is not necessary to affirmance and disagreement is not sufficient for reversal. The question for us is not whether in our opinion there was invention, but whether the finding that there was none is consistent with the evidence."

The Court further pointed out in this decision that it does not disturb findings of fact of the District Court on appeal "unless upon an examination of the evidence they are clearly wrong." The decision in *Standard Oil Development Co. v. Marzall*, 86 U. S. App. D. C. 210, 181 F.2d 280, further indicates that findings of fact of the District Court denying patentability will be set aside only where they are found to be clearly erroneous. This, of course, is in accord with Rule 52(a), Federal Rules of Civil Procedure. Attention is also invited to *Esso Standard Oil Co. v. Sun Oil Co.*, 97 U. S. App. D. C. 154, 229 F.2d 37; *Bechtold v. Watson*, 102 U. S. App. D. C. 353, 253 F.2d 875 and *Smith v. Kingsland*, 85 App. D. C. 284; 178 F.2d 26. Accordingly, appellant has the burden of demonstrating that there was no rational basis in the evidence before the District Court for its decision agreeing with the Patent Office tribunals that claims 14, 15, 16 and 18 are unpatentable.

The District Court found these claims unpatentable on the basis that the improvement, if any, is merely a matter of mechanical skill (J.A.-94) and that it would be obvious to modify any of three different prior art nozzle constructions (J.A. 96, Findings of Fact Nos. 5, 6 and 7). It is only necessary that this Court consider any one of these findings free from clear error to warrant affirmance of the District Court's dismissal of the complaint.

Appellant urges (Br. 12) that the filler material required for successfully filling joints in runways for jet aircraft must be highly viscous, and that it will not flow unless great force is employed. However, appellant's application (J. A. 37-47) is not limited to that use, but instead indicates that the apparatus is of general utility for filling joints between sections of "walks, roadways, airfield runways and the like." (J.A.-37) Furthermore, the application indicates that the filler material is applied in cold condition (J.A.-37) but it fails to specify the composition of the material or that it is highly viscous. Heltzel Patent No. 2,636,425, as noted hereinabove, indicates (J. A. 79) that among the new developments of joint sealing materials are substances which are semi-plastic and "resist flow" through conventional devices and states that in the apparatus disclosed therein "enormous pressure" is applied to "drive" the materials "forcibly into the prepared groove in the concrete." Thus, appellant's arguments relative to the nature of the filler material are not significant here, because the claims in issue are drawn to apparatus rather than to the materials and

because Heltzel patent No. 2,636,425 provides a disclosure which is at least as complete as appellant's for the highly viscous filler material for use in dispensing apparatus.

The District Court acted in accord with the provisions of 35 U.S.C. 103, reproduced in appellant's brief (Br-10), in dismissing the complaint. It sustained the contention of defendant (J.A. 96, Findings of Fact Nos. 5, 6, and 7) that it would be obvious to a person of ordinary skill in the art to make the bottom open in the nozzles shown in (1) Figure 24 of Heltzel patent No. 1,946,972 (J. A. 61), (2) Figure 7 of Heltzel patent No. 1,946,972 (J. A. 59), and (3) Figure 2 of Heltzel patent No. 2,636,425 (J. A. 75). This change of a mechanical nature does not amount to invention. *Smith v. Kingsland, supra*. It is respectfully submitted that these findings are supported in the record and that they are clearly correct. The most simple structure for inserting filler material in a relatively narrow joint would be a hollow pipe having an open end or bottom, and the obviousness of removing the bottom from the specified nozzles of the prior art to insure filler material being forcibly applied at the bottom of the joint being formed is essentially conceded in the record (J.A.-29, 30). It would also be apparent that such removal of the bottoms would insure packing of material in the bottom of the joint where the nozzles disclosed in the Heltzel patents were to be used, with any unnecessary appurtenances omitted, to fill a groove previously formed in concrete which had already set. Moreover, the showing in Figure 4 of Heltzel patent

No. 2,636,425 (J. A. 77) of a nozzle which opens downwardly as well as rearwardly also suggests providing openings in the bottoms of the aforementioned nozzles.

Appellant refers (Br-14) to a tendency of his nozzle, due to the rearward opening therein, to move forwardly as the joint is filled with material. No such operation was disclosed in the application (J. A. 37-47) as filed. Even if it be contended that this tendency to forward motion is inherent in appellant's construction, no indication of patentability of the claims in issue arises, since it is apparent that such a tendency is equally inherent in the prior art nozzles when modified in the obvious manner discussed hereinabove.

For the foregoing reasons, it is respectfully submitted that there is no error in the District Court's determination that the nozzle structure, defined in claim 14, is unpatentable over the prior art. While claim 15 (J.A. 50) includes the additional recitation of a lateral flange, it is submitted that this recitation clearly fails to define over reference constructions such as that of Figure 24 of Heltzel patent No. 1,946,972 (J.A. 61), with its flange designated 37 t.

It is also suggested that the additional recitation in claim 16 of a surface extending from the tube and having a downwardly projecting portion adds nothing of patentable significance. As specifically pointed out by the Board of Appeals (J.A. 88), this downwardly projecting portion "need not produce appellant's intended function" or serve "any useful function." Thus, it is apparent that this projecting por-

tion can fit within the upper part of the joint behind the nozzle to limit the filler material to the desired height in the joint only when the rib is located at the top of the rearwardly extending opening in the nozzle. So far as claim 16 is concerned, the "surface" recited therein might be at the extreme end of the nozzle with the downwardly projecting portion actually extending below the lower end of the nozzle. With this construction, it would be impossible to insert the end of the nozzle into the joint.

Appellant urges (Br. 11) that the refusal to allow the claims in issue that are drawn to the nozzle is inconsistent with the allowance of claims to the nozzle "with a leveling plate and rib," apparently referring to claim 10, which has been held allowable. The distinction between claim 10 and claims 14 and 15 is apparent from the fact that neither of the latter two claims recite the rib construction at all. Claim 16, as pointed out hereinabove, fails to set forth such relationships between the "surface" and the "downwardly projecting surface portion" as will cause the latter portion to extend into the upper portion of the joint while the end of the nozzle is disposed in the joint. Since claim 10 was found by the Board of Appeals to include the relationships necessary for the rib to provide its desired function (J.A. 88), the distinction over claim 16 is clear. Thus, the refusal of the lower tribunals to allow the claims in issue is in no way inconsistent with the action of the Board of Appeals in finding the other claims allowable.

Claim 18 (J. A. 50), recites the broad combination of an applicator or nozzle supplying filler material

in a downward direction with "joint cleaning means" and a vehicle. It was the view of the District Court (J.A. 97, Finding of Fact No. 11) and the Board of Appeals (J.A. 88) that it would be obvious to provide the apparatus of the Heltzel patents with cleaning means such as a blower. Appellant does not specifically allege error in this holding of the tribunals below but merely asserts (Br. 15) that the combination "should be patentable."

It is asserted by appellant (Br. 13) that his apparatus has been used successfully "at many airports." However, evidence of usefulness or commercial success is significant only where there is doubt on the question of patentability. *Union Metal Manufacturing Co. v. Ooms*, 81 U.S. App. D.C. 76, 154 F.2d 857; *Great Atlantic and Pacific Tea Co. v. Supermarket Equipment Corporation*, 340 U.S. 147. Here, neither the District Court nor the Patent Office tribunals indicated that they had any doubt whatever that claims 14, 15, 16, and 18 are unpatentable over the prior art.

In connection with this same matter of usefulness and commercial success, it is particularly significant that claims 1, 4, 5, and 10 have been held allowable and that appellant could have received a patent including these claims more than two years ago if he had not brought the present action to obtain additional claims. For all that has been shown here, any successful use which appellant's apparatus has enjoyed may have been due to features which the Patent Office has already granted recognition by the

allowance of claims 1, 4, 5, and 10. Under these circumstances, the commercial use relied upon by appellant has no significance with respect to the question of whether the claims in issue are patentable. *Miller v. Weeks et al.*, 129 F. Supp. 241, affirmed 97 U.S. App. D.C. 138; 229 F.2d 21. Other decisions on the point that utility or commercial success cannot be pertinent to the question of patentability unless shown to be directly attributable to the subject matter set forth in the claims in issue are *Marconi Telegraph Co. of America v. United States*, 320 U.S. 1, 35-36; *Foxboro Co. v. Taylor Instrument Cos.* (C.A. 2, 1946), 157 F.2d 226. It is also of significance that appellant was contending only for claims 1, 4, 5, and 10, subsequently found allowable by the Board of Appeals, at the time the examiner finally rejected the application (J.A. 6).

CONCLUSION

For the reasons given, it is submitted that error has not been shown in the decision of the District Court and that its decision should, accordingly, be affirmed.

Respectfully submitted,

CLARENCE W. MOORE
Solicitor, United States Patent Office
Attorney for Appellee

DAVID KREIDER
Of Counsel

January 1961

REPLY BRIEF FOR APPELLANT

United States Court of Appeals

FOR THE DISTRICT OF COLUMBIA CIRCUIT

No. 16,047

*United States Court of Appeals
District of Columbia Circuit
FILED FEB - 1 1961*

Joseph W. Dowell
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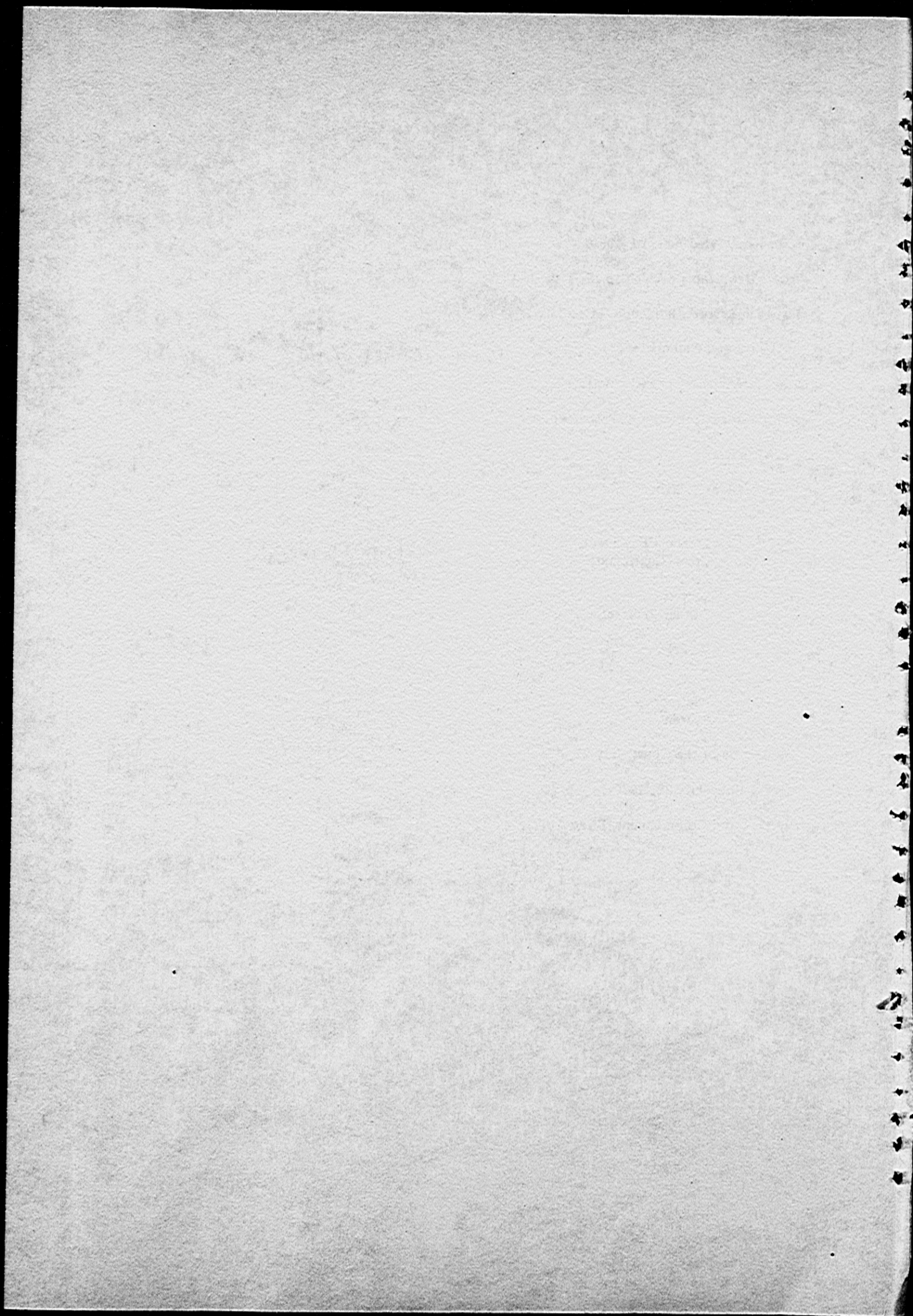
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A. YATES DOWELL

A. YATES DOWELL, JR.

1345 Pennsylvania Ave., N.W.
Washington, D. C.

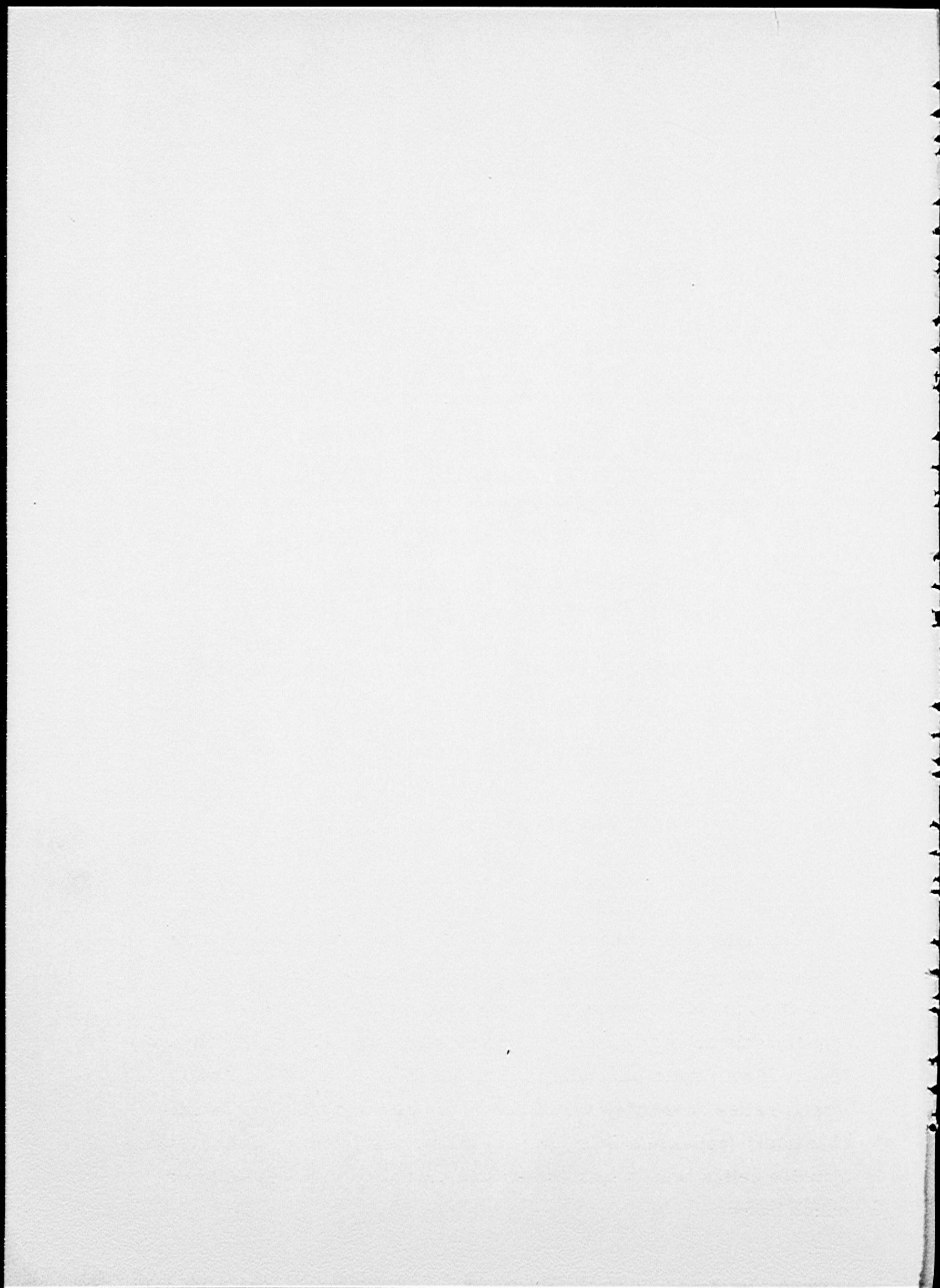
Attorneys for Appellant



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UNITED STATES COURT OF APPEALS
For The District Of Columbia Circuit

No. 16,047

CHARLES P. GROSS,

Appellant,

v.

ROBERT C. WATSON,
Commissioner of Patents,

Appellee.

APPEAL FROM THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

REPLY BRIEF FOR APPELLANT

Appellee's Brief does not weaken or answer the principal points of appellant. Appellant-applicant is seeking claims which will afford protection for his invention and it has been decided that his invention is patentable but with a rider or unnecessary limitations which seriously impair if not render his claims and his patent of little value. Appellee inaptly relies on the view that differences which are of a "mechanical character" (appellee's Brief, page 6) are without invention. In addition, appellee relies heavily upon the presumption of correctness of the decision below.

The decision below is clearly erroneous and inconsistent with the evidence. The decision was based upon Smith v. Kingsland, 178 F.2d 26, 29, which holds:

"that an improvement which is merely mechanical in nature does not amount to invention."

However, when the facts of that case are compared to those of the instant case, it is apparent that the District Court erred in its analogy. In Smith v. Kingsland, a patent was sought based upon the mere omission of a screen located over a housing or baffle in a burner of the type used for curing tobacco. The applicant for patent in that case conceded that his purpose was merely to eliminate a non-essential element of his earlier issued patent on the same burner.

The instant case is in sharp contrast to the cited case. Here the applicant has not merely changed an element in an existing combination. The two prior art Heltzel patents are directed toward a different problem in a different environment, namely the laying of relatively flowable material along the top of a groove between unset concrete. This is done by apparatus having a nozzle which extrudes the material to the rear of the nozzle.

Appellant's tool is not used in a shallow groove near the surface between portions of unset concrete, but rather in an irregular crack or space between set portions of concrete. Applicant's tool is not designed merely to lay an extrusion of relatively flowable material along a shallow groove, but instead to force extremely viscous material directly toward the bottom of a crack or opening whose depth varies greatly, and such tool is so designed that the reaction tends to push the tool along as the crack is filled.

It is obvious that the Heltzel tools could not be used to serve applicant's purpose. There is no suggestion in the Heltzel patents of opening the bottom of any of their nozzles and such modification comes

solely from applicant's disclosure and in the Heltzel environment would undoubtedly produce an unsatisfactory result.

The mere fact that there is some similarity of general purpose between the tools of Heltzel and that of applicant does not support the view that a modification suggested only by applicant, and by the problem applicant solved, would be obvious.

This is not the situation where the reference patent and applicant have been seeking a solution to the same problem as in Smith v. Kingsland. Here Heltzel directed his attention to one problem and applicant to a very different problem. The mere fact that the implements used have some degree of similarity in that they both provide sources of supply, a conveying tube and a nozzle, does not in itself mean that the Heltzel patents suggest any solution to the problem which applicant solved. There is no dispute that the problem which applicant has attacked was novel and specifically unlike that of the Heltzel patents. Appellant's new problem has beget a new solution. The mere fact that the physical structure itself may appear simple is itself not a bar.

"The fact that the changes were so slight is quite irrelevant, so long as they were essential to the purpose, which they were. * * * invention is not to be gauged by the necessary physical changes, so long as there are some, but by the directing conception which alone can beget them. Traitel v. Hungerford, 18 F.2d 66, CCA 2." H. C. White Co. v. Converse, 20 F.2d 311, 313, 1927 C.D. 220 (CCA 2, 1927).

"When old devices are changed at all, the change may be dictated by a new conception, which it took originality to conceive. Strictly, the old device is not then put to a new use; the new use begets a new device. In such cases it requires but little physical change to make an invention." H. K. Regar & Sons, Inc. v. Scott & Williams, Inc., 63 F.2d 229, 17 USPQ 81 (CCA 2, 1933).

The foregoing are merely illustrative of the established, but oft overlooked, doctrine that the question of invention is to be viewed in the light of the "directing conception" rather than by the misleading apparent simplicity of the physical changes. This doctrine is still

believed to be valid and not in conflict with A & P Tea Co. v. Supermarket Corp., 349 U.S. 147. In the latter the court found nothing more than old elements performing their usual functions (an old three-sided rack moving goods over an old grocery counter).

The doctrine upon which appellant relies is substantiated in Topliff v. Topliff et al., 145 U.S. 156, 12 S.Ct. 825, 326 L.Ed. 658 (1892), in which the Court said:

"While it is possible that the Stringfellow and Surles patent might, by a slight modification, be made to perform the function of equalizing the springs which it was the object of the Augur patent to secure, that was evidently not in the mind of the patentees, and the patent is inoperative for that purpose. Their device evidently approached very near the idea of an equalizer; but this idea did not apparently dawn upon them, nor was there anything in their patent which would have suggested it to a mechanic of ordinary intelligence, unless he were examining it for that purpose. It is not sufficient to constitute an anticipation that the device relied upon might, by modification, be made to accomplish the function performed by the patent in question, if it were not designed by its maker, nor adapted, nor actually used, for the performance of such functions."

In L-O-F Glass Fibers Co. v. Watson, Commissioner of Patents, 97 App. D.C. 69, 228 F.2d 40 (1955), an apparently slight physical change was held patentable in view of the "creative talent" exemplified.

The Board of Appeals recognized the nature of the new problem and appellant's solution in its allowance of Claims 1, 4, 5 and 10. However even the broadest of these, namely 10, includes limitations such as the rib and plate which are not essential to the heart of the invention. Thus while the invention has been recognized, the means for realizing its fruits by claims directed to the essential features has been denied.

Certainly the Statutes, and the Patent Office founded as a result thereof, were not intended to deprive a patentee of his invention, such being contrary to its purpose and intent. The appellee's assertion is that there is no invention. However, until appellant's disclosure there was no solution for the long existing problem; nor do any of the references

disclose similar structures nor structures functioning like appellant's. There is nothing to justify the proposed modification of the structures of the prior patents — such conception being lacking therein, and dependent upon far more than ordinary mechanical skill for its realization.

CONCLUSION

The decision of the District Court should be reversed.

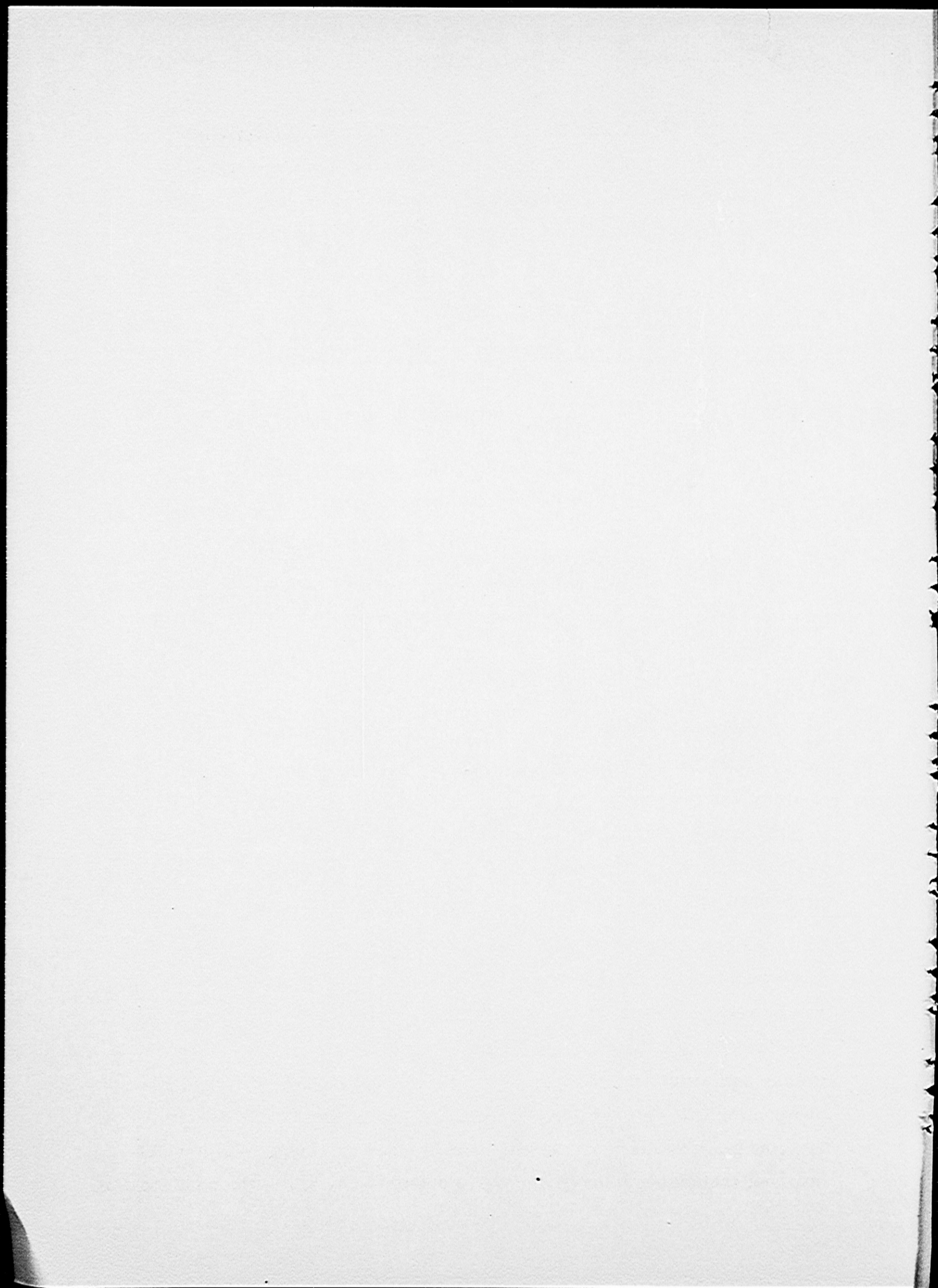
Respectfully submitted,

A. YATES DOWELL

A. YATES DOWELL, JR.

1345 Pennsylvania Avenue, N.W.
Washington, D. C.

Attorneys for Appellant



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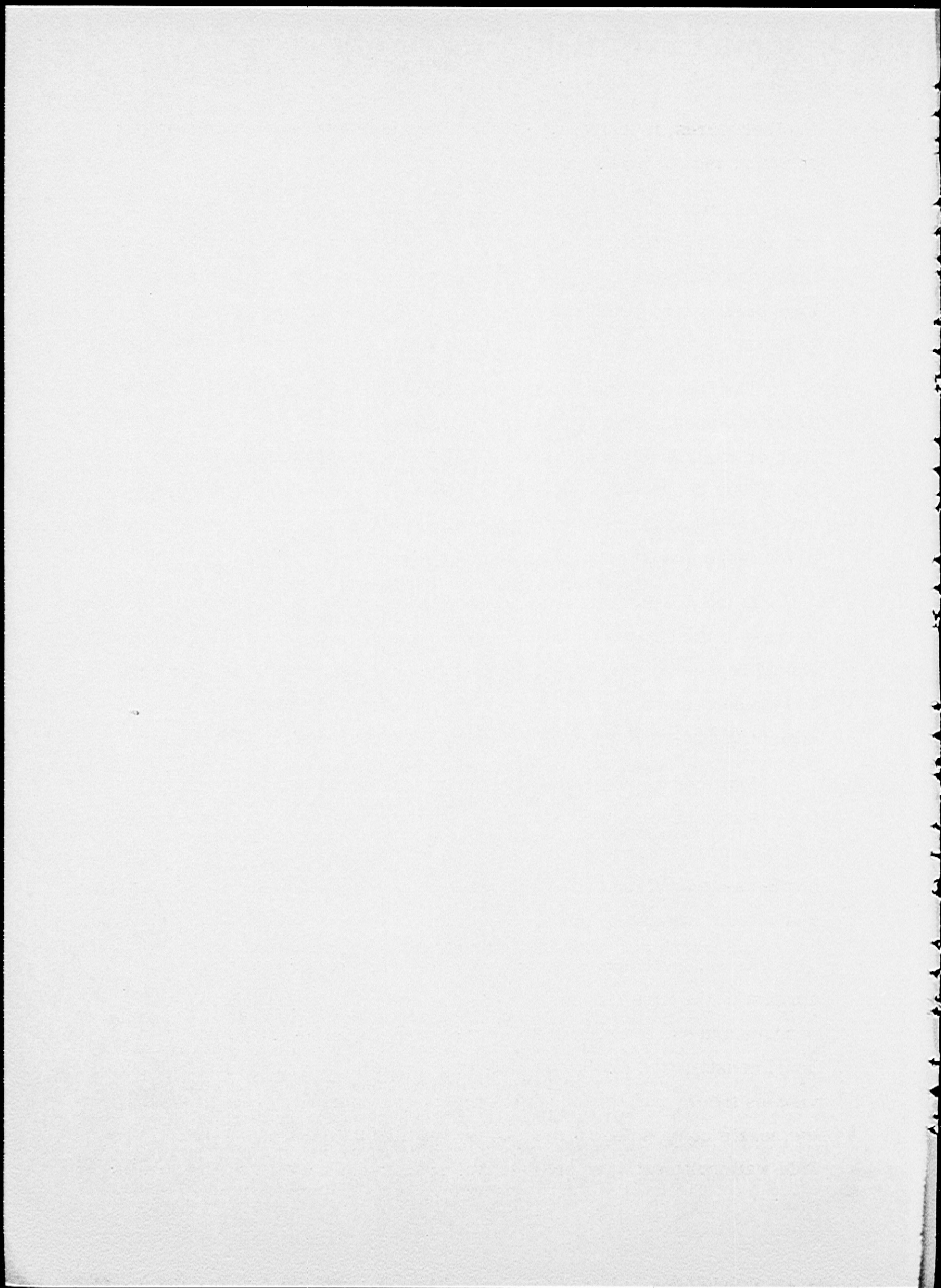
ROBERT C. WATSON,
Commissioner of Patents,

Appellee.

PETITION FOR REHEARING

A rehearing of the above entitled cause is petitioned for the reason that the issue has not been resolved. The decisions of the District Court and the Court of Appeals indicate that appellant has not succeeded in bringing the issue before the courts. Consequently, instead of having a decision which can be used as a guide for future procedure, all is confusion.

As presented in applicant's brief, the question before the courts, and which has not been decided, is whether or not the Patent Office, having recognized invention in applicant's nozzle for directing ordinarily non-flowable material into irregular concrete expansion joints and cracks and which nozzle includes a flattened downwardly directed open end portion with a rearwardly located discharge opening and with a leveling plate and depressing rib, is correct in refusing a claim which does not include such leveling plate and depressing rib in the combination.



In other words, is it proper that the invention be held patentable on the one hand and not patentable on the other?

An effort has been made to present this case so that there is this issue to be determined, but there has been no ruling on this specific issue and without a ruling to indicate that the specific points presented have been considered or adjudicated, there is no guide post for future conduct.

The District Court merely agreed with the Patent Office and the Court of Appeals merely broadly reaffirmed such agreement without any light or explanation other than a reaffirmance of Shafer v. Watson, No. 16,009 decided February 9, 1961, which decision incidentally does not cover the issue here, and accordingly it is urged that determination of the issue should not remain forever a mystery.

In the present era when freedom has become of age, and particularly in these United States of which we are a part, a litigant is entitled to and should have more than a mere refusal when a specific issue is involved and presented and counsel in practice for 35 years should have a knowledge of the basis of a decision to use as a guide in his future practice.

Expressed in other language, the question arises as to what is the res adjudicata? Thus far in the present case, the only answer that can be found is that it is confusion because of the silence of the courts on the issue involved and which has been set forth in applicant's briefs and without any ruling thereupon.

As set forth appellant, applicant for a patent here, in keeping abreast of the times is the first to solve the particular problem and produce and use a nozzle, as set forth in claim 14, of a unique and novel construction for "forcibly filling joints in pavement with a highly viscous filler" and consequently requiring exceedingly great pressure, the nozzle comprising "a tube having one end terminating in spaced side walls with exterior side surface spaced apart less than the spacing



of the walls of the joint between which the device is to be inserted for filling," and "with the internal surfaces of such walls" of the tube "providing at the end of the tube an elongated depending discharge passage opening downwardly" not sidewise "and rearwardly". In other words, at one end of the oval portion the nozzle is open and such nozzle is "closed at the front and sides thereof, whereby the highly viscous filler can be forcibly discharged from said passage downward into the joint to be filled and upon the filling of the joint at the point of such downward discharge, force exerted upon the filler will be transmitted to the closed front portion of the discharge tube without any counter force at the opposite open end and this will facilitate forward motion of the apparatus during the filling of a joint."

In other words, we have the flattened end of the tube open or cut out at the rear so that when the material is forced downward into a crack, it will fill the crack from the bottom up and then since there is no force against the tube where it is open or cut out, force will be exerted at the opposite end of the oval tending to move the hose bodily forward as it is downwardly directed.

It would seem unconscionable to deny the patent seeker here protection on his invention without the limitation of the rib.

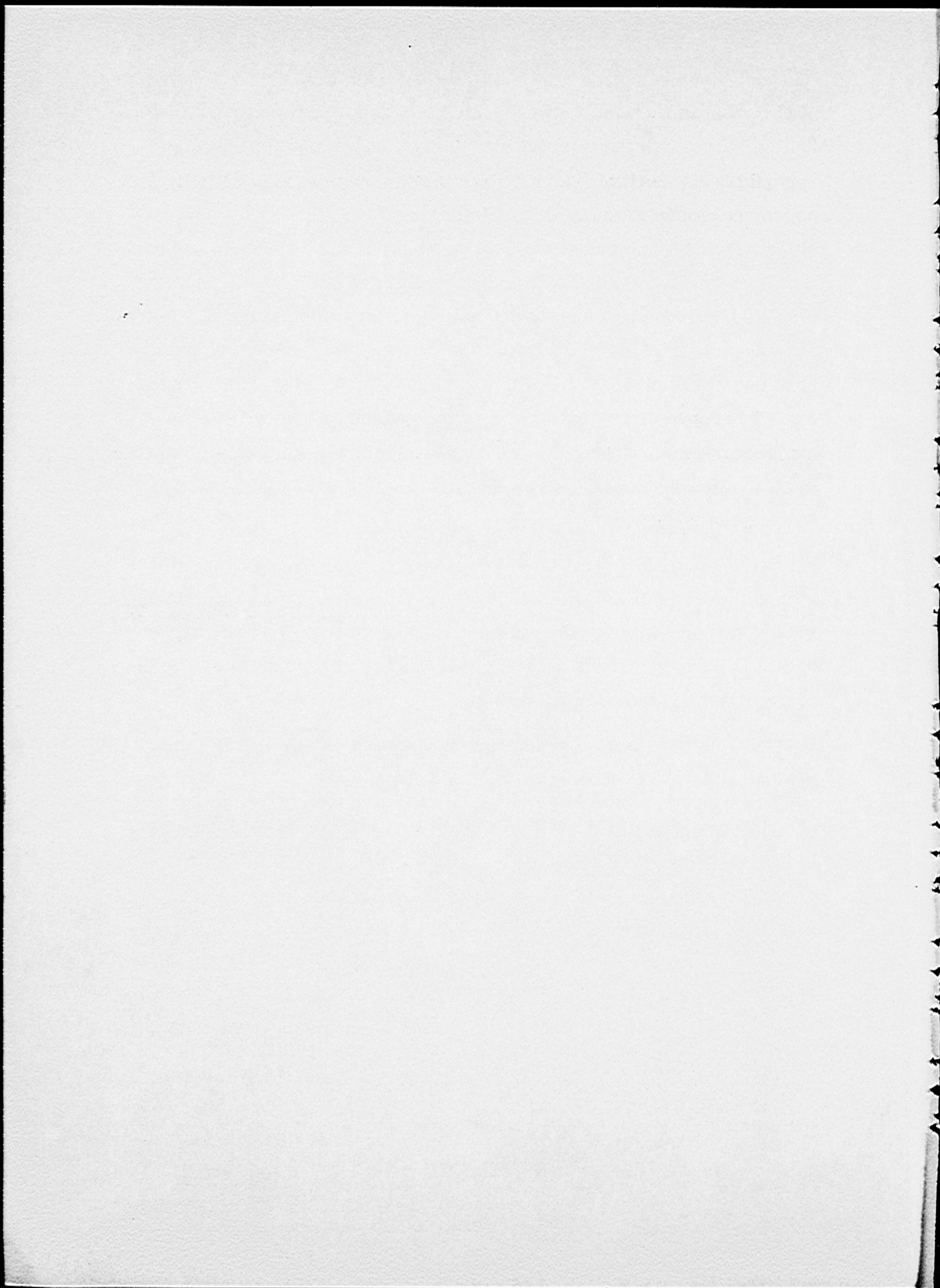
Favorable consideration, rehearing, and reversal of the District Court is respectfully solicited.

Respectfully submitted,

A. YATES DOWELL
A. YATES DOWELL, JR.

1345 Pennsylvania Ave., N.W.
Washington 4, D. C.

Attorneys for Appellant



CERTIFICATE

I hereby certify that the above petition is filed in good faith, and not for purposes of delay.

A. YATES DOWELL, JR.

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing and annexed Petition for Rehearing were this 29th day of March, 1961, mailed, postage prepaid, to C. W. Moore, Esquire, Attorney for Appellee, U. S. Patent Office, Washington 25, D. C.

A. YATES DOWELL, JR.